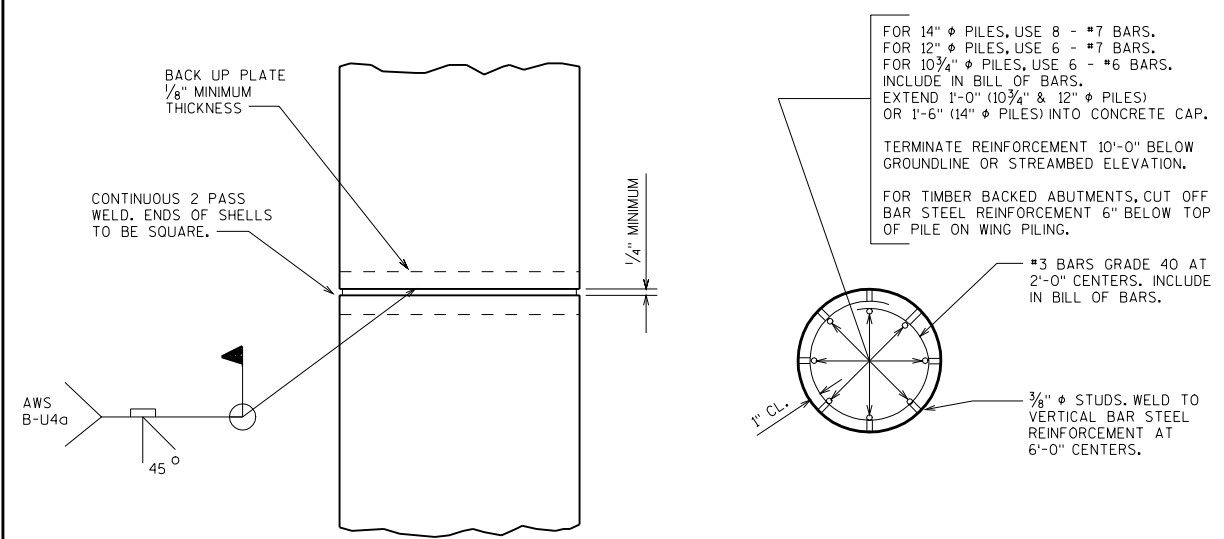


STEEL 'HP' SHAPES



CAST-IN-PLACE
'PIPE PILE'

SECTION THRU CONCRETE
CAST-IN-PLACE PILING
USED WHEN PILES ARE EXPOSED
(PIER BENTS OR TIMBER BACKED ABUTMENTS)

DESIGNER NOTES

IF PILES ARE EXPOSED IN COMPLETED STRUCTURE AND SUBJECT TO BENDING,
PLACE THE FOLLOWING NOTE ON PLANS:
PILE SPLICES SHALL BE MADE BY A CERTIFIED WELDER USING LOW HYDROGEN ELECTRODES.

IF APPLICABLE, PLACE THE FOLLOWING NOTE ON THE PLANS:
PILES PLACED IN PREBORED HOLES CORED INTO ROCK DO NOT REQUIRE DRIVING.

FULL DESIGN LOADING CAN BE USED IF PREBORED HOLE IS LARGE ENOUGH TO AVOID
PILE HANGUPS AND ALLOW FILLING WITH CONCRETE.

NOTES

CAST-IN-PLACE PILE SHELL MATERIAL SHALL BE A.S.T.M. DESIGNATION A-252, GRADE 2
OR EQUAL.

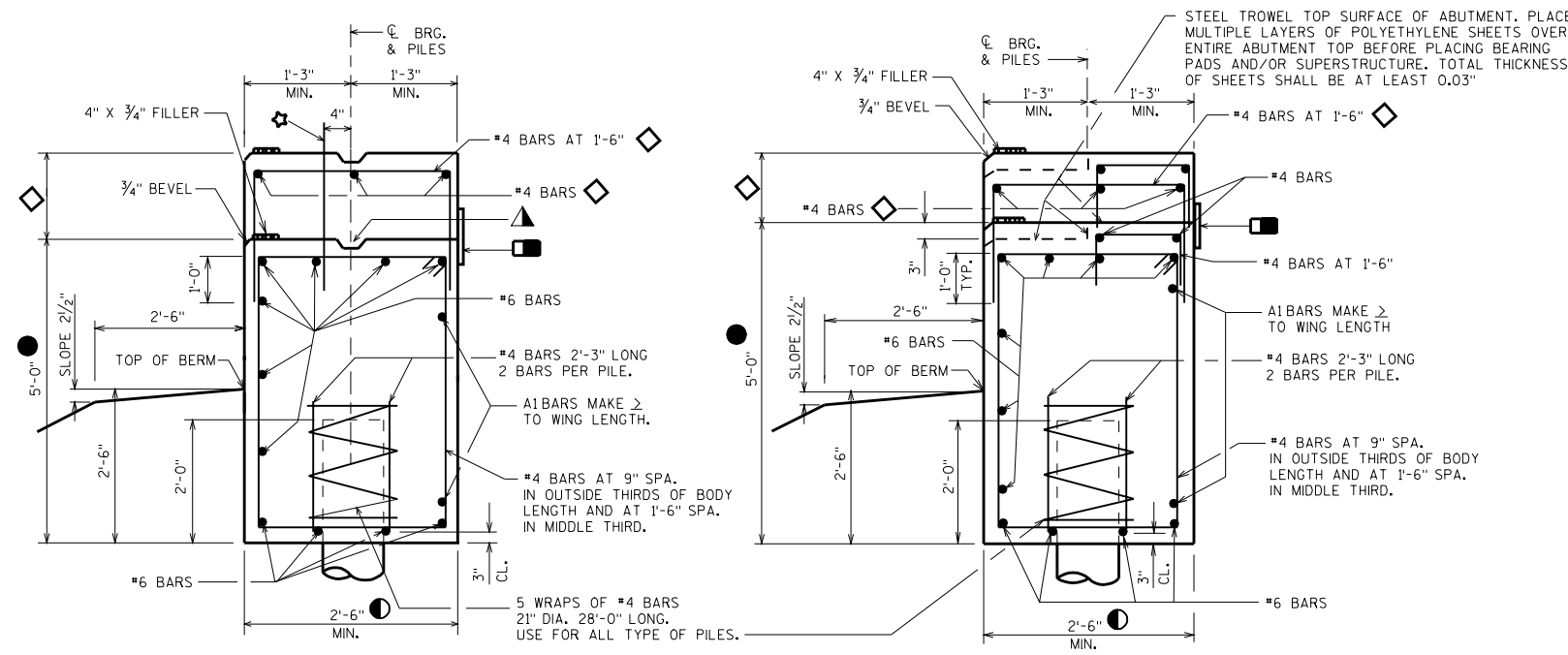
STEEL 'HP' PILE MATERIAL SHALL BE A.S.T.M. DESIGNATION A36.

PILE BEARING CAPACITY

1. CAST-IN-PLACE:
A. 10 $\frac{3}{4}$ " DIA. - 55 T/PILE.
B. 12" DIA. - 65 T/PILE
C. 14" DIA. - 80 T/PILE.

2. STEEL 'HP':
A. MAX. STRESS OF 6000 P.S.I. WHERE BOULDERS ARE PRESENT.
B. MAX. STRESS OF 9000 P.S.I. WITHOUT LOAD TEST FOR COMPACT SOILS
AND SOFT ROCK.
C. MAX. STRESS OF 12,000 P.S.I. WITHOUT LOAD TEST IF BEARING ON
SOUND ROCK.
D. MAX. STRESS OF 16,000 P.S.I. WITH LOAD TEST IF BEARING ON SOUND
ROCK.

PILE DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 6/02



TYPE A1 WITH FIXED SEAT

TYPE A1 WITH SEMI-EXPANSION SEAT

LEGEND

- ★ #5 BARS AT 1'-0" (2'-0" LONG). THESE BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE.
- ◇ WHEN THIS DIMENSION ≥ 4" THIS ADDITIONAL REINFORCEMENT SHALL BE ADDED.
- USE 2'-6" FOR ALL SLAB SPANS AND FOR GIRDER SPANS WITH NO PAVING NOTCH EXCEPT 54", 54W", 70" & 72W" GIRDERS WITH SKEWS > 25° - USE 2'-9". USE 3'-2" FOR GIRDER SPANS WITH PAVING NOTCH.
- DIMENSION IS FROM BOTTOM OF ABUTMENT TO LOW BEAM SEAT OR LOW SIDE OF SLAB TYPE SUPERSTRUCTURE.
- 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZONTAL AND VERTICAL JOINTS ON BACKFACE.
- ▲ KEYED CONST. JOINT FORMED BY BEVELED 2" x 6".
- ★★ WINGWALL WIDTH SHALL BE 1'-6" WHEN TYPE "M" RAILING OR VERTICAL FACE PARAPET, TYPE "TX" IS USED.

DESIGNER NOTES

LAP LENGTHS FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

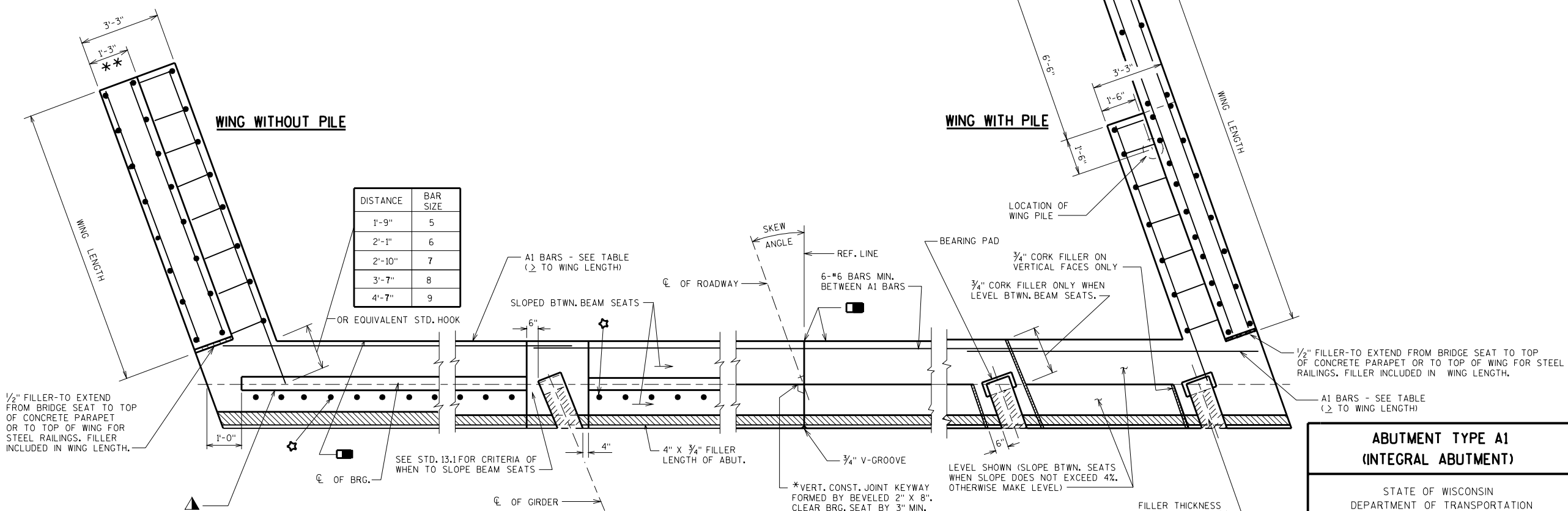
PILING SPACING IN ABUTMENT BODY SHALL BE 8'-0" MAX. FOR ALL TYPES OF PILING.

*WHEN BODY SECTION IS > ± 50'-0" LONG PROVIDE VERTICAL CONSTRUCTION JOINT. RUN BAR STEEL THRU JOINT. SEAL JOINT WITH 18" RUBBERIZED MEMBRANE WATERPROOFING.

CONCRETE POURED UNDER WATER WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH SECTION 502.3.6.3 STANDARD SPECIFICATIONS.

THE SEMI-EXPANSION SEAT SHALL BE USED WHEN REQUIRED AS STATED IN CHAPTER 12, TABLE 12.1 OF THE BRIDGE MANUAL OR WHENEVER A WING PILE IS REQUIRED.

THE FIXED SEAT CANNOT BE USED WHEN A WING PILE IS REQUIRED.



DISTANCE	BAR SIZE
1'-9"	5
2'-1"	6
2'-10"	7
3'-7"	8
4'-7"	9

ABUTMENT TYPE A1 (INTEGRAL ABUTMENT)	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1-03

DESIGNER NOTES

SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE). EXTEND SEALER 3" BELOW GUTTER LINE AT INSIDE FACE.

THE SELECTION OF WING WITH PILE OR WING WITHOUT PILE IS BASED ON THE REQUIRED WING HEIGHT AND LENGTH AND THE LIMITS OF WING HEIGHT AND LENGTH SHOWN.

ALL WING BARS SHALL BE EPOXY COATED.

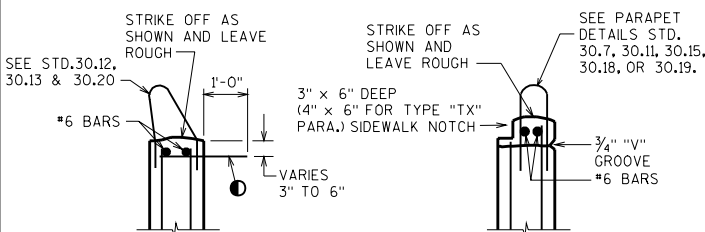
WHEN TYPE "F", "W" OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

DESIGN LOADS

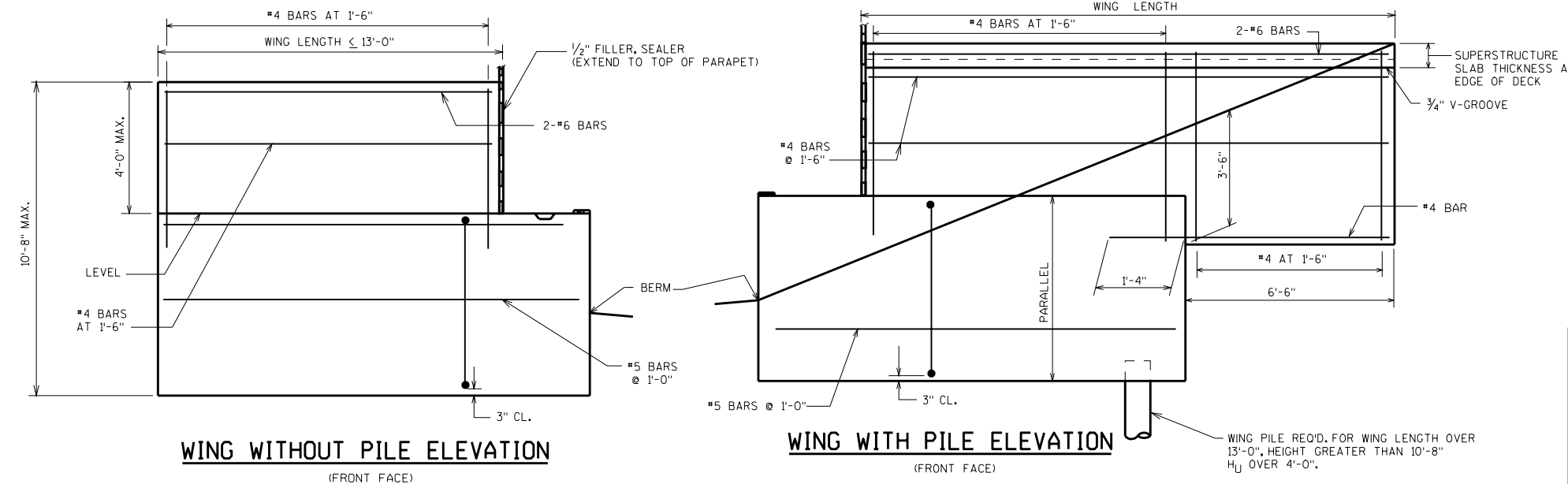
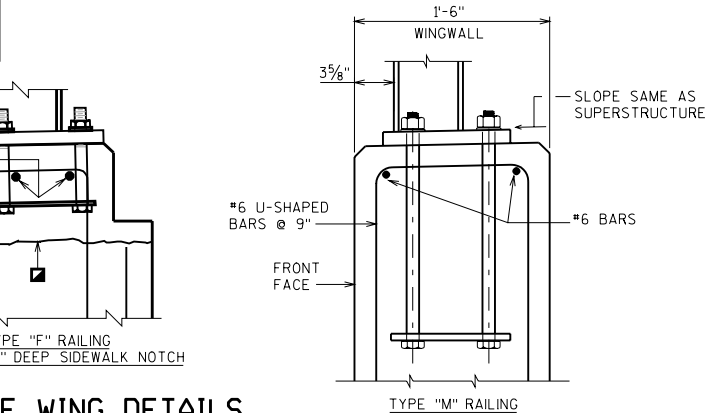
LIVE LOAD = 2'-0" SURCHARGE
LOAD FACTOR = 1.3 (5/3 LL+5/3E)
Fy = 60,000 P.S.I.
Fc = 3,500 P.S.I.
HORIZONTAL EARTH LOAD = 33*/SQ. FT. EQUIV. FLUID PRESSURE

WING LENGTH	WING HEIGHT				BARS
	8'-6"	10'-0"	11'-6"	13'-0"	
10'-0"	*5-#7	*5-#7	5-#5		W
	*7-#8	*7-#8	6-#5		A1
12'-0"	*5-#7	*5-#7	6-#5	5-#6	W
	*7-#8	*7-#8	6-#7	7-#7	A1
16'-0"	6-#6	5-#7	6-#7	5-#8	W
	5-#8	6-#8	7-#8	8-#8	A1
20'-0"	6-#7	7-#7	7-#8	6-#9	W
	6-#9	7-#9	7-#10	8-#10	A1

* WING WITHOUT PILE VALUES SHOWN. (FOR WING WITH PILE THAT HAS WING LENGTH IN THIS REGION, USE VALUES FOR 11'-6" WING HEIGHT.)



TYPE "LF", "HF", OR "5IF" PARAPET
#4 DOWELS (COATED) 2'-0" LONG AT 1'-0" ALONG ENTIRE WING LENGTH, PLACE IN WING ADJACENT TO SURFACE DRAIN APRON ONLY.

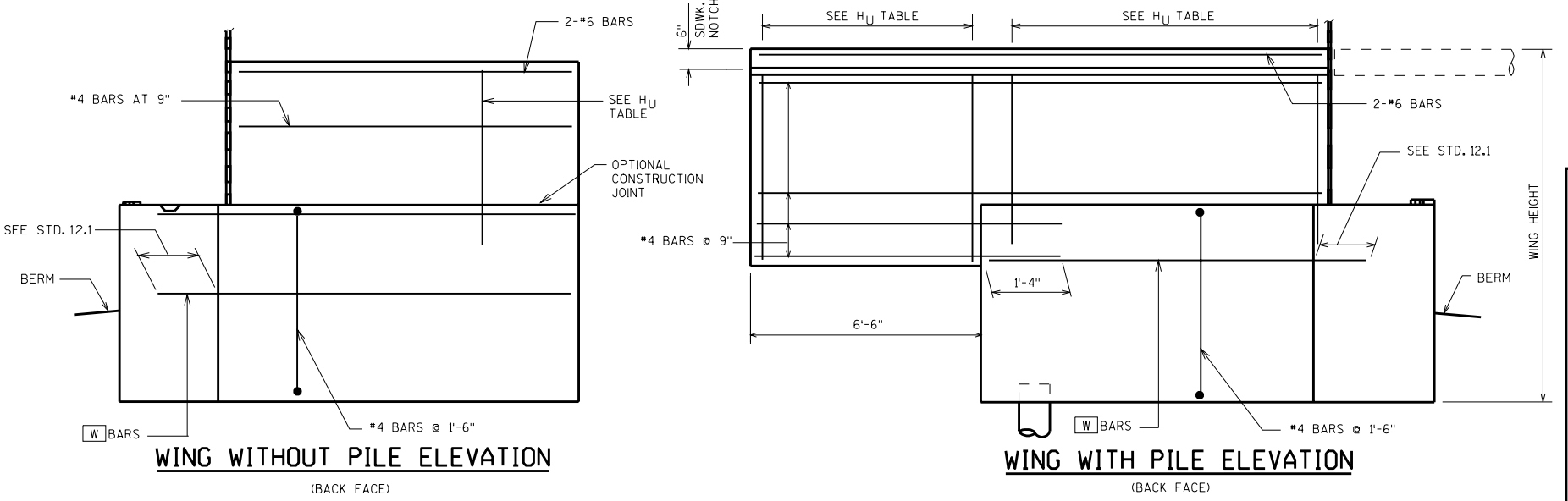


WING WITHOUT PILE ELEVATION

(FRONT FACE)

WING WITH PILE ELEVATION

(FRONT FACE)

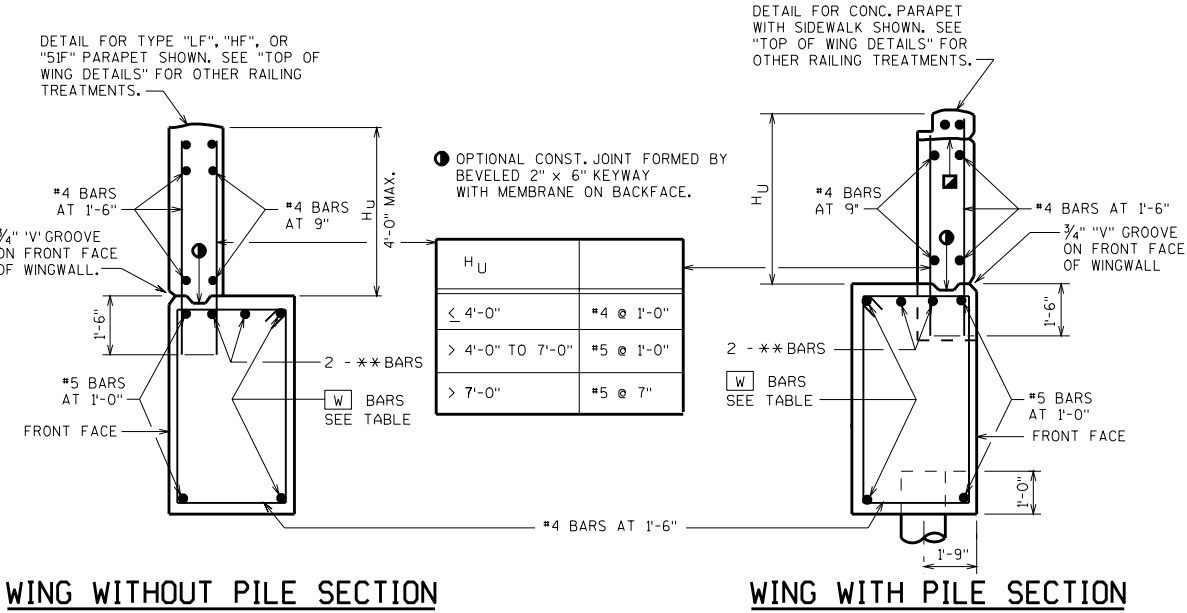


WING WITHOUT PILE ELEVATION

(BACK FACE)

WING WITH PILE ELEVATION

(BACK FACE)



WING WITHOUT PILE SECTION

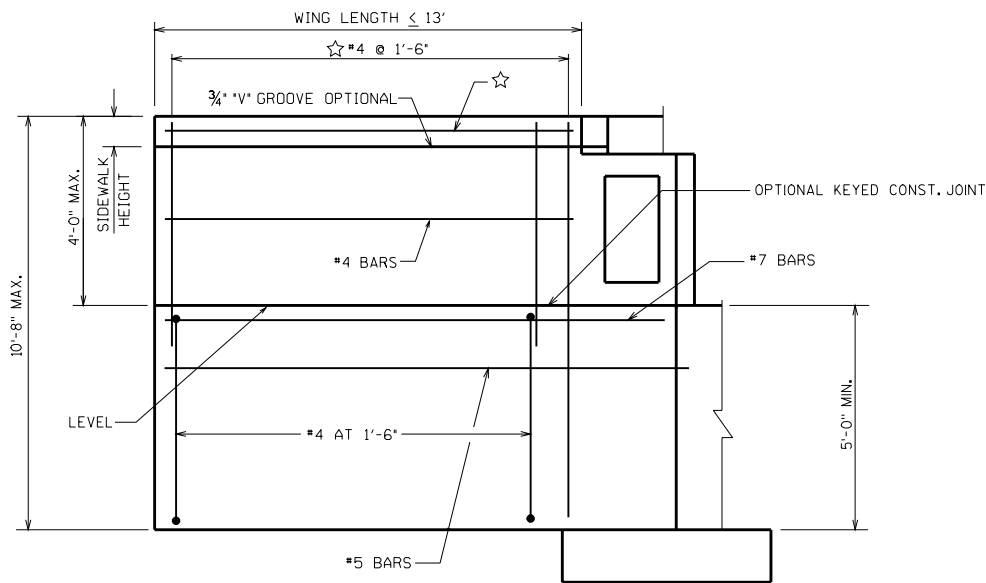
WING WITH PILE SECTION

** BARS TO BE SAME SIZE AS "W" BARS.
CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.

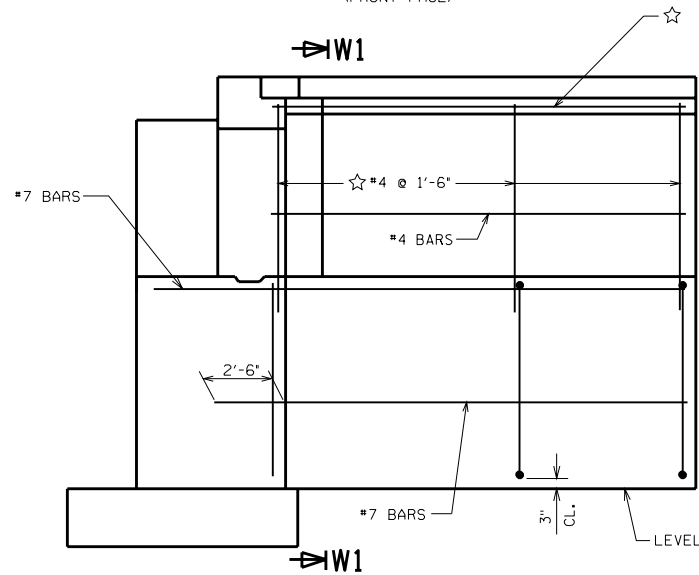
ABUTMENT TYPE A1

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

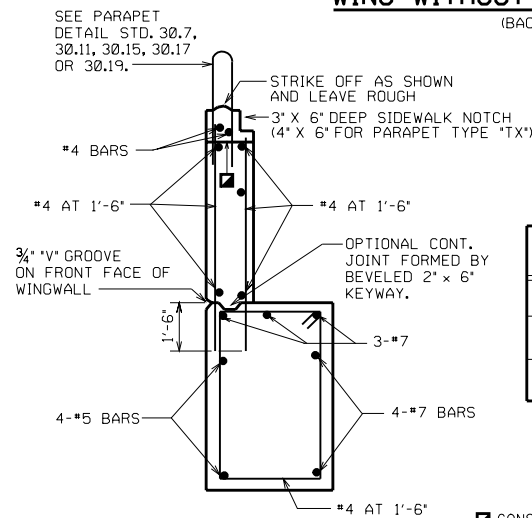
APPROVED: _____ DATE: 6-02



WING WITHOUT PILE ELEVATION
(FRONT FACE)



WING WITHOUT PILE ELEVATION
(BACK FACE)



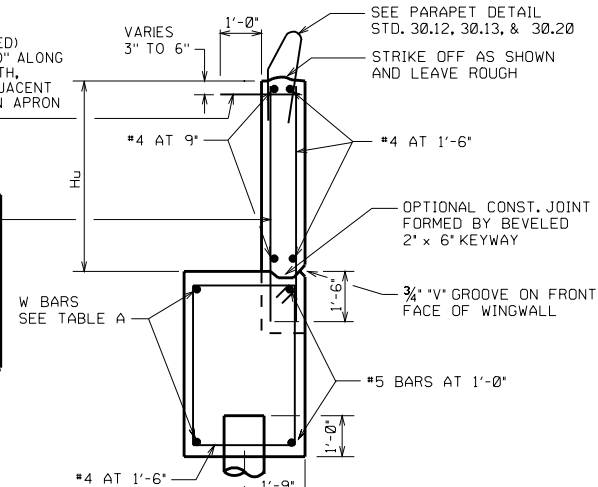
SECTION W1

CONC. PARAPET AND SIDEWALK

CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.

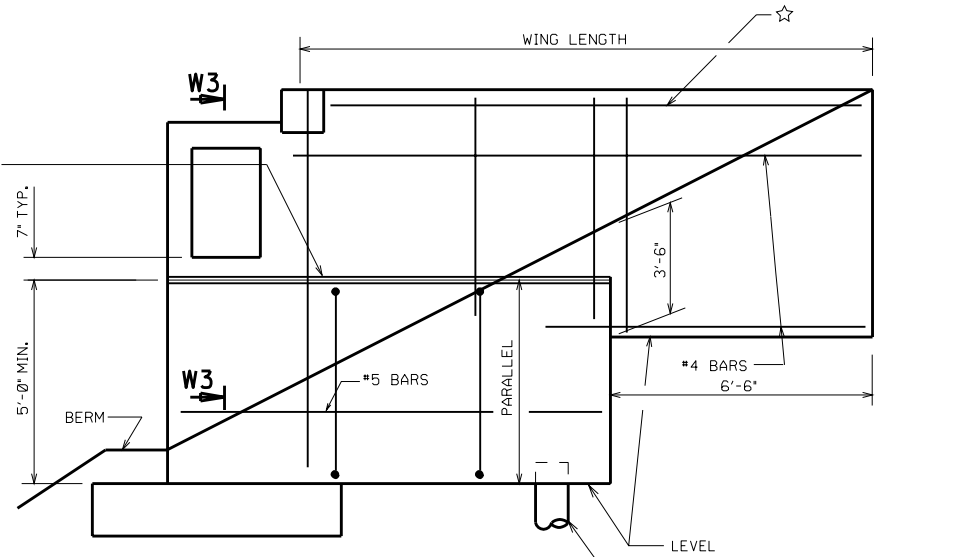
$\#4$ DOWELS (COATED) $2'-0"$ LONG AT $1'-0"$ ALONG ENTIRE WING LENGTH. PLACE IN WING ADJACENT TO SURFACE DRAIN APRON ONLY.

H_U	
$\leq 5'-0"$	$\#5 @ 1'-0"$
$> 5'-0"$ TO $7'-0"$	$\#5 @ 1'-0"$
$> 7'-0"$	$\#5 @ 7"$

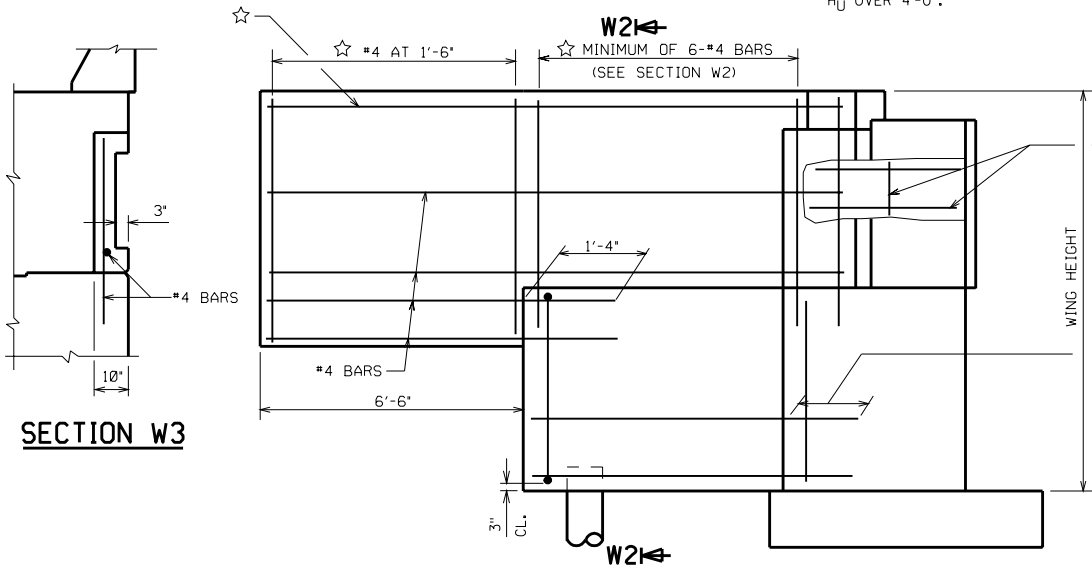


SECTION W2

TYPE "LF" OR "HF" PARAPET



WING WITH PILE ELEVATION
(FRONT FACE)



WING WITH PILE ELEVATION
(BACK FACE)

DESIGNER NOTES

LENGTH OF A3 BARS SHALL BE \geq TO WING LENGTH.

WING WITH PILE & WING WITHOUT PILE CAN BE USED FOR EITHER SIDEWALK OR SLOPED FACE PARAPETS. THE TYPE OF WING TO USE IS BASED ONLY ON THE WING HEIGHT AND WING LENGTH LIMITATIONS SHOWN.

LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

FRONT ROW PILES ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 40 P.S.F. AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID PRESSURE OF 20 P.S.F. AND "P".

\star IF "F", "W" OR "M" STEEL RAILING IS ATTACHED TO TOP OF WINGS, INSTEAD OF PARAPETS AS SHOWN, SEE DETAIL "A".

WHEN TYPE "F", "W", OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

ALL WING BARS SHALL BE EPOXY COATED.

FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK: IF SIDEWALL IS USED, FORM SIDEWALL $2"$ BELOW CONC. DIAPH.

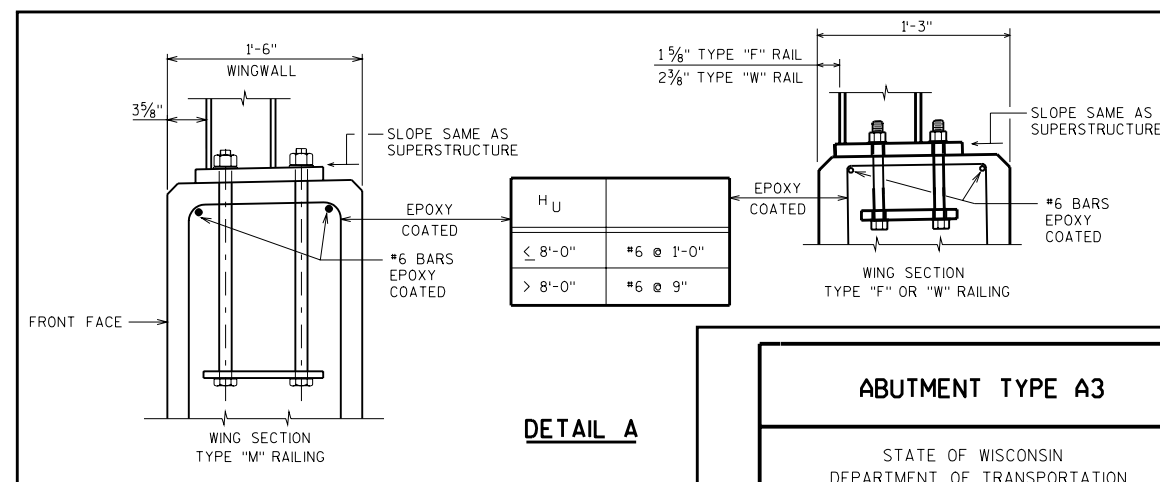
DESIGN LOADS

HORIZONTAL EARTH LOAD = 33 P.S.F.
 EQUIV. FLUID PRESSURE.
 LIVELOAD = $2'$ SURCHARGE
 LOAD FACTOR (WINGS) = $1.3 (5/3 LL + 5/3 E)$
 LOAD FACTOR (BODY) = $1.3 (5/3 LL + 1.3 E)$
 $f_y = 60,000$ P.S.I.
 $f'_c = 3,500$ P.S.I.

TABLE A

WING 2 LENGTH	WING 2 HEIGHT				BARS
	10'-0"	11'-6"	13'-0"	14'-6"	
12'-0"	—	5-#5	—	—	W
	—	6-#5	—	—	A3
16'-0"	5-#6	6-#6	5-#7	—	W
	6-#6	4-#8	6-#7	—	A3
20'-0"	6-#7	5-#8	6-#8	7-#8	W
	4-#9	5-#9	6-#9	7-#9	A3
24'-0"	6-#9	7-#9	7-#10	8-#10	W
	8-#8	8-#9	8-#10	9-#10	A3
26'-0"	6-#10	7-#10	6-#10*	7-#10*	W
	6-#10	8-#10	8-#10**	9-#10**	A3

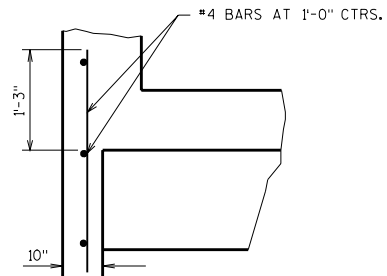
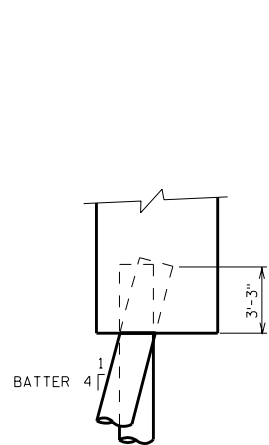
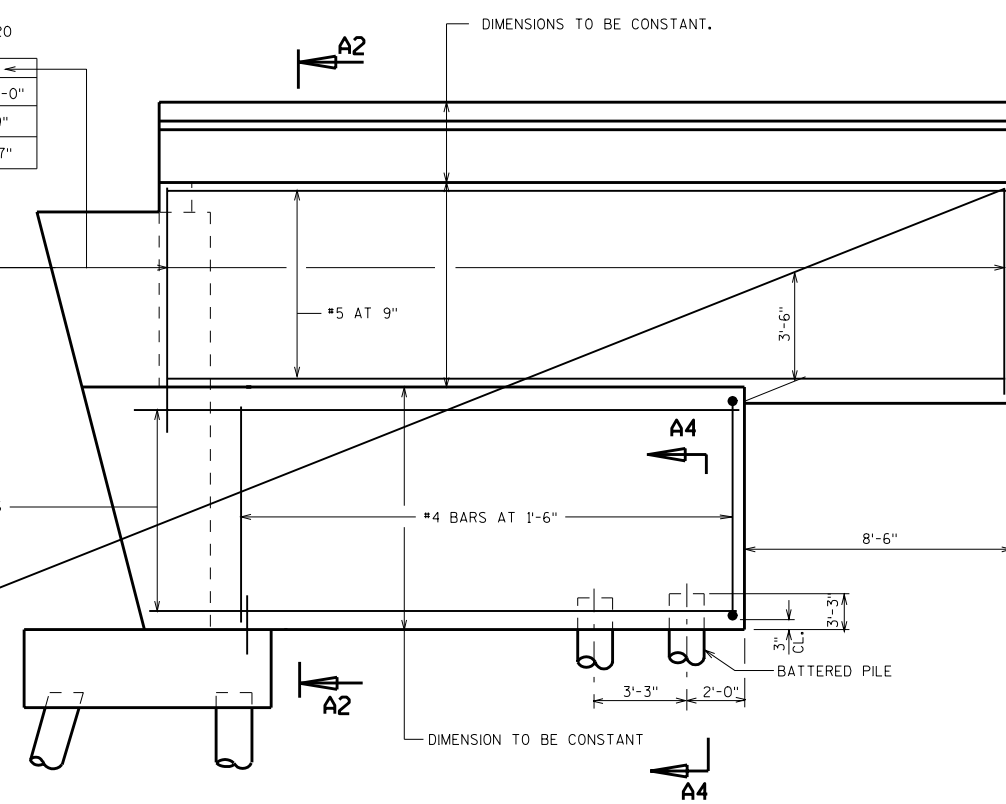
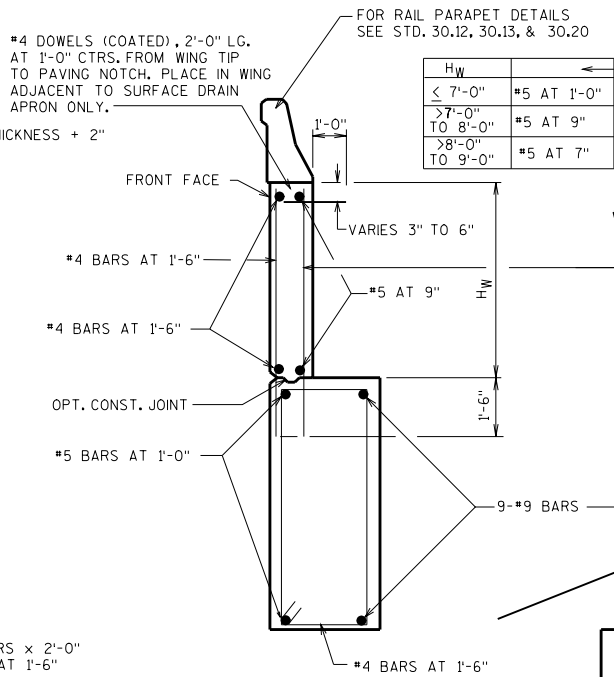
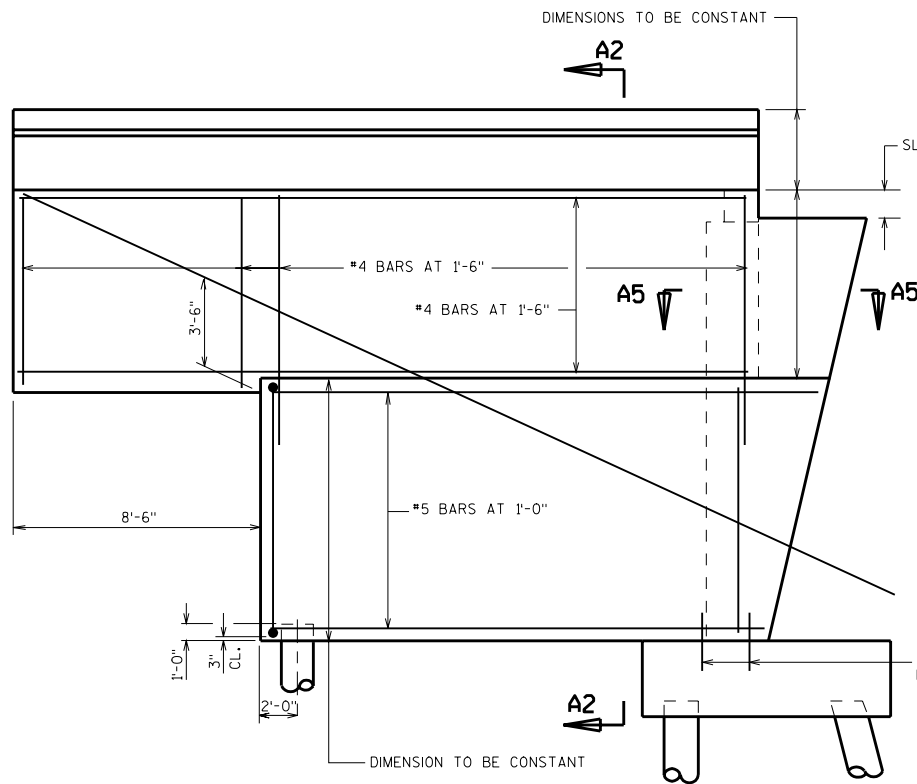
* USE $4'-6"$ FOR LOWER WING POUR WIDTH
 ** USE $3'-3"$ MIN. FOR BEARING SEAT WIDTH



ABUTMENT TYPE A3

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 6-02



DESIGNER NOTES

BODY IS DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 40 LBS. PER SQ. FT. 2'-0" SURCHARGE AND SUPERSTRUCTURE REACTIONS "P".

WINGS ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 33 LBS. PER SQ. FT. AND A 2'-0" SURCHARGE. A 10 KIP LATERAL RESISTANCE IS USED FOR THE GROUP OF 2 WING PILES. NO LATERAL RESISTANCE IS USED FOR SINGLE PILES IN WING.

FRONT ROW PILES ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 40 LBS. PER SQ. FT. AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID PRESSURE OF 20 LBS. PER SQ. FT. AND "P".

UNIT WEIGHT OF SOIL IS ASSUMED AS 120 LBS. PER CU. FT.

BRIDGE SEATS BETWEEN BEARINGS SHALL SLOPE 1" FROM FRONT FACE OF BACKWALL.

$f_y = 60,000$ P.S.I.
 $f'_c = 3,500$ P.S.I.
 LOAD FACTOR (BODY) = 1.3 (5/3 LL + 1.3 E)
 LOAD FACTOR (WINGS) = 1.3 (5/3 LL + 5/3 E)

PAY LIMITS FOR EXCAVATION FOR STRUCTURES & GRANULAR BACKFILL IS SHOWN IN CHAPTER 12 OF THE BRIDGE MANUAL.

ALL WING BARS SHALL BE EPOXY COATED.

WHEN TYPE "F", "W" OR "M" RAILING IS USED, LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.

FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK: IF SIDEWALL IS USED, FORM SIDEWALL 2" BELOW CONC. DIAPH.

ABUTMENT A4 PILE FOOTING

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
6-02

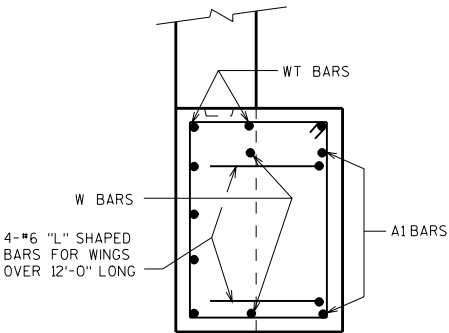
DESIGNER NOTES

THIS TYPE OF WING MAY BE USED IN LIEU OF WINGS PARALLEL TO ROADWAY IF APPROVED BY THE BUREAU OF STRUCTURES DESIGN SECTION. DO NOT USE FOR STREAM CROSSINGS WHEN HIGH WATER ELEVATION IS ABOVE TOP OF BERM ELEVATION.

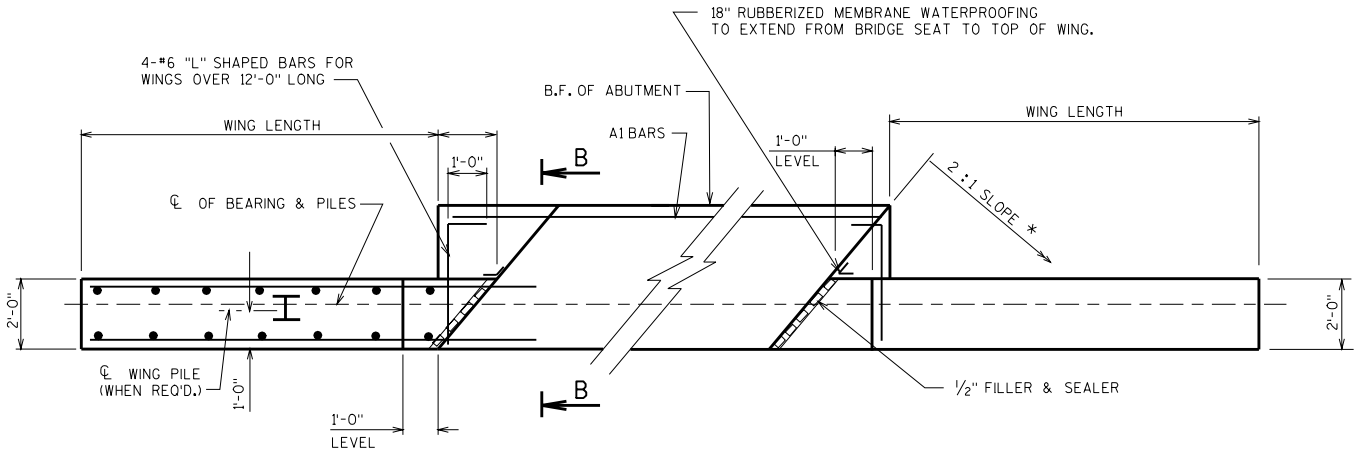
*USE 2½:1 FOR THE UNSTABLE CLAYS WHICH ARE SOMETIMES ENCOUNTERED IN NORTHWEST WISC. (SUPERIOR AREA)

DESIGN LOADS (WINGS)

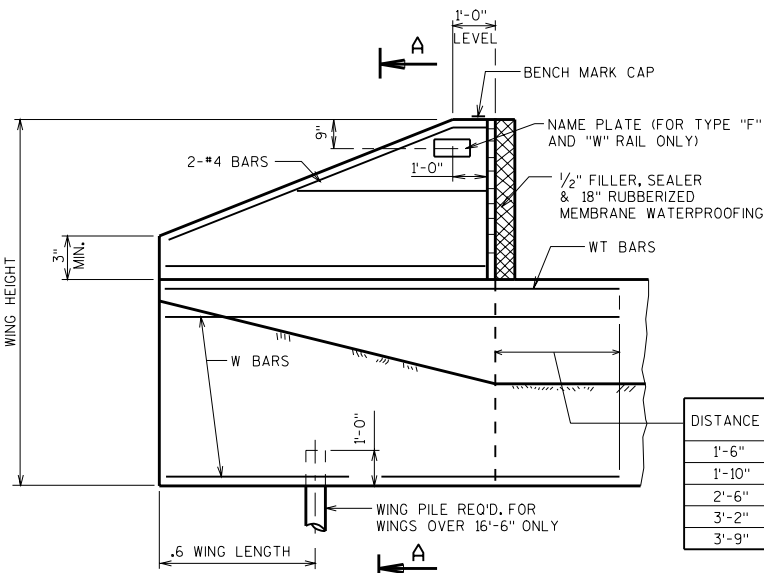
LIVE LOAD = 1'-0" SURCHARGE
LOAD FACTOR = 1.3 (5/3 LL + 5/3 E)
HORIZONTAL EARTH LOAD = 33 LBS. PER SQ. FT. EQUIV.
FLUID PRESSURE
fy = 60,000 P.S.I.
fc = 3,500 P.S.I.



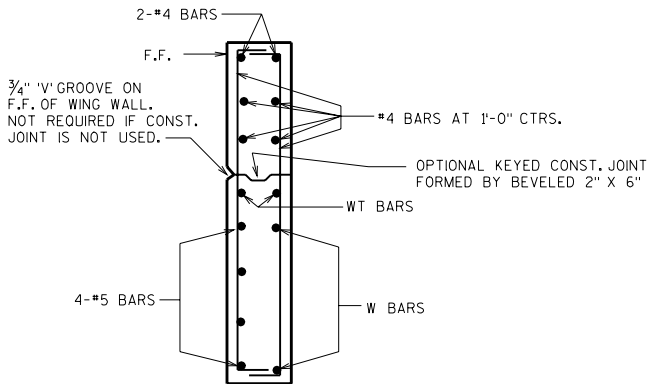
SECTION B-B
SEE STD. 12.1 & 12.2 FOR NOTES & DETAILS



PLAN FOR TYPE A1 ABUTMENT



DISTANCE	BAR SIZE
1'-6"	5
1'-10"	6
2'-6"	7
3'-2"	8
3'-9"	9



SECTION A-A

TABLE A

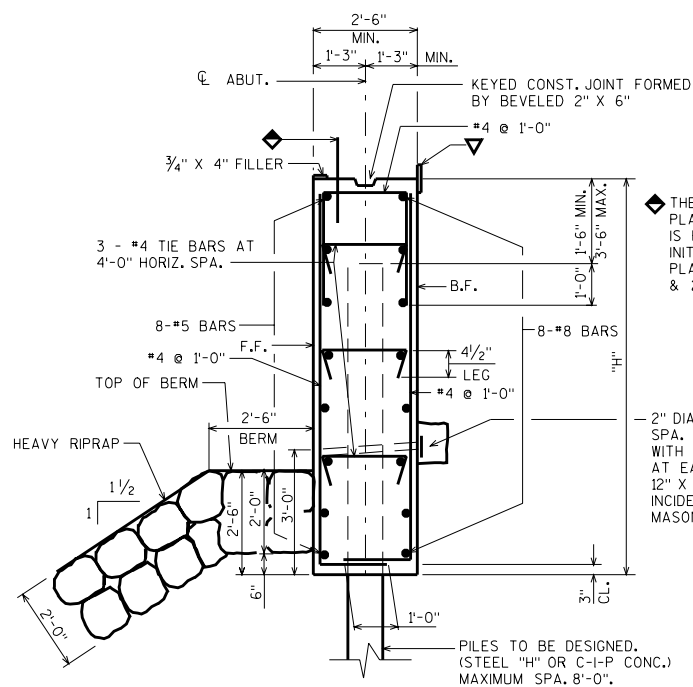
WING LENGTH	WING HEIGHT				BARS
	8'-6"	10'-0"	11'-6"	13'-0"	
10'-0"	4-#5	4-#5	5-#5	---	W
	2-#5	2-#5	2-#5	---	WT
	4-#6	4-#6	4-#6	---	A1
12'-0"	---	4-#7	5-#7	4-#8	W
	---	2-#7	2-#7	2-#8	WT
	---	4-#6	5-#6	4-#7	A1
16'-0"	---	5-#8	6-#8	5-#9	W
	---	2-#8	2-#8	2-#9	WT
	---	6-#6	4-#8	6-#7	A1
20'-0"	---	---	8-#8	8-#9	W
	---	---	2-#8	2-#9	WT
	---	---	6-#8	7-#8	A1

▲ WING PILE REQUIRED

DETAILS FOR WINGS PARALLEL TO A1 ABUTMENT CENTERLINE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-02

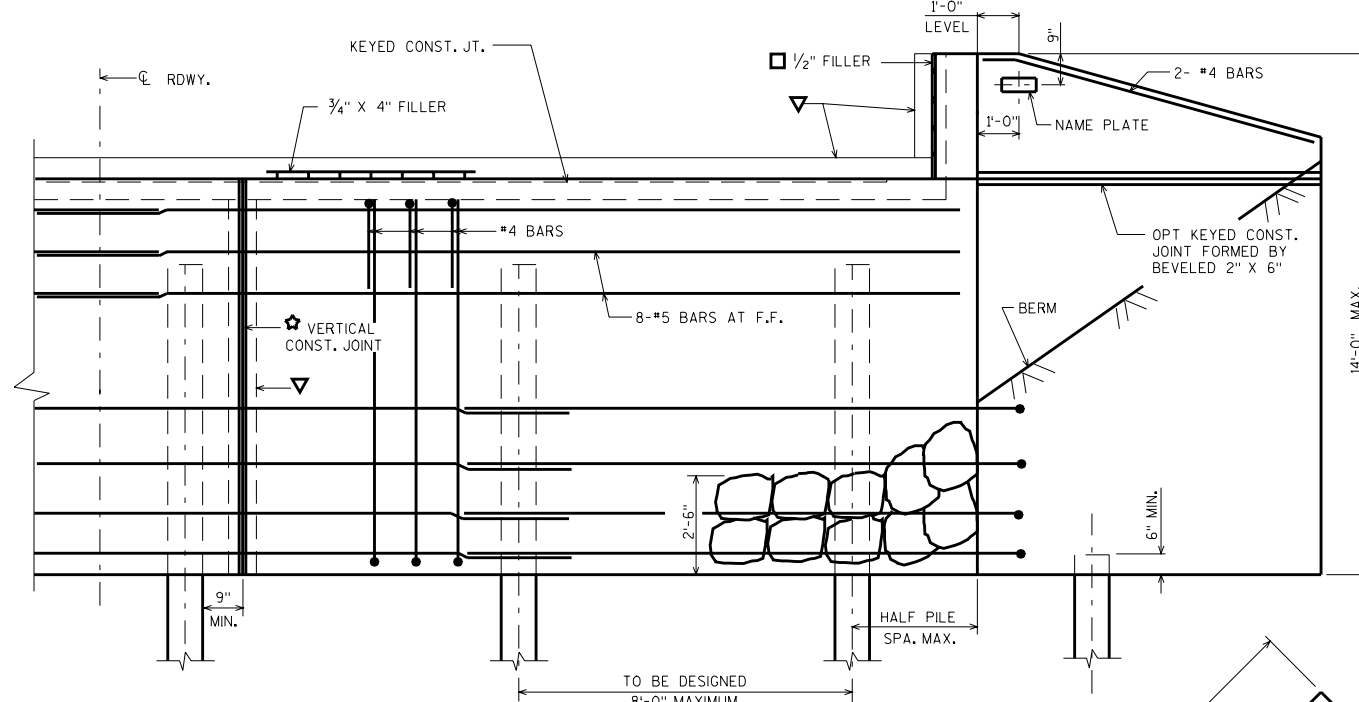


TYP. SECTION THRU ABUTMENT BODY

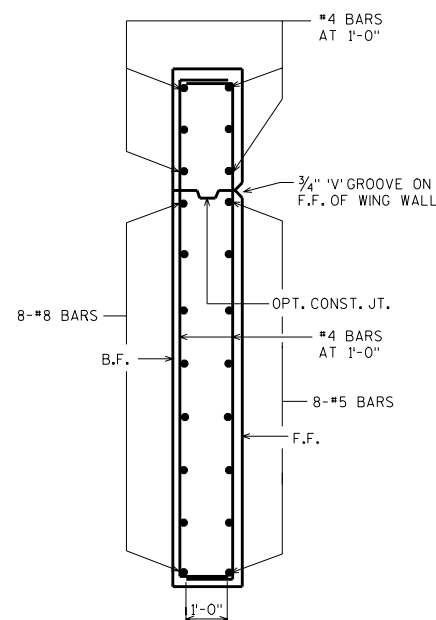
"H" MINIMUM 5'-0"
"H" MAXIMUM 10'-0"

◆ THESE BARS MAY BE PLACED AFTER CONCRETE IS POURED, BUT BEFORE INITIAL SET HAS TAKEN PLACE. SEE STD. 12.1 & 27.5

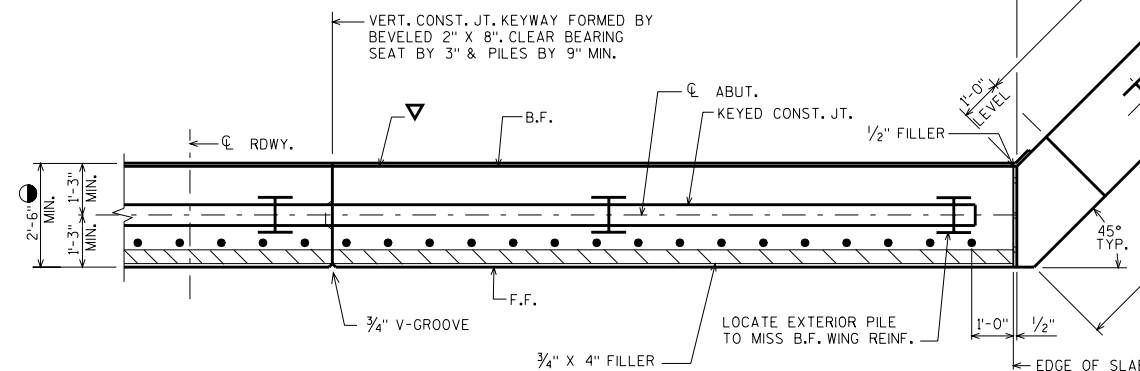
— 2" DIA. WEEP HOLE AT 20'-0" SPA. USE GEOTEXTILE FABRIC WITH SIZE 1 COARSE AGGREGATE AT EACH HOLE (ON B.F. 12" X 12" X 12" MIN.) COST INCIDENTAL TO "CONCRETE MASONRY, BRIDGES".



ELEVATION



SECTION A



PLAN

NOTES

□ SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONC.)

DO NOT PLACE FILL ABOVE 3'-0" FROM BOTTOM OF ABUTMENT UNTIL SUPERSTRUCTURE IS IN PLACE.

▽ 18" RUBBERIZED MEMBRANE WATERPROOFING.

● WHEN ABUTMENT WIDTH > 2'-10" FIXED POINT OF WING ROTATION SHALL BE ON F.F. OF ABUTMENT (0° SKEW ONLY).

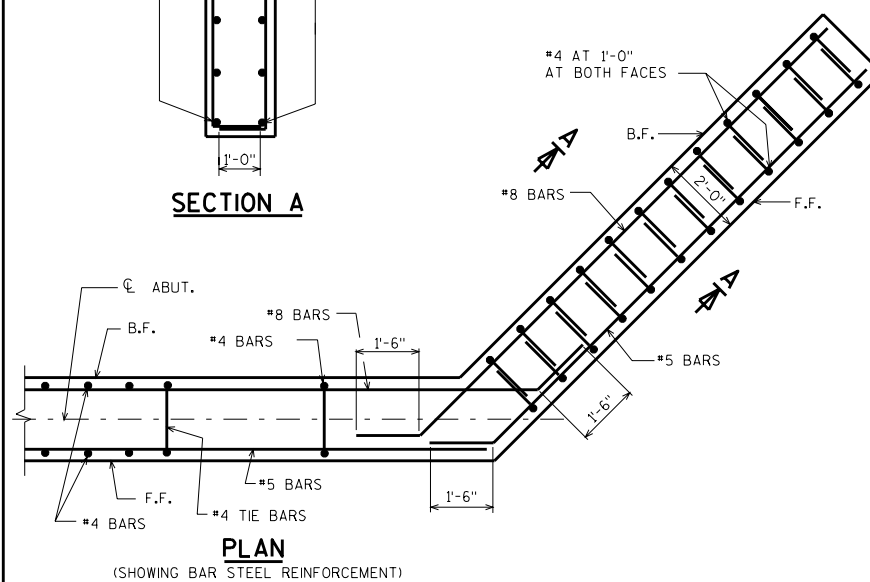
DESIGNER NOTES

FOR SLAB AND PRESTRESSED GIRDER SPANS $L < 200'-0"$ & FOR STEEL GIRDER SPANS $L < 150'-0"$ WHERE L = LENGTH OF CONTINUOUS SUPERSTRUCTURE BETWEEN ABUTMENTS.

WHEN GIRDERS WITH SEMIEXPANSION SEAT OR FIXED SEAT, OR SLAB SPAN WITH SEMIEXPANSION SEAT ARE USED, MAKE BEAM SEATS SIMILAR TO THAT SHOWN ON STANDARD 12.1.

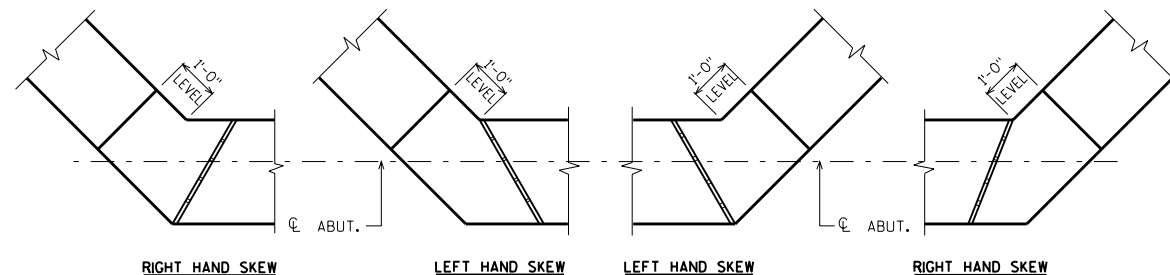
★ WHEN BODY SECTION IS > ± 50'-0" LONG, PROVIDE VERT. CONST. JOINT. RUN BAR STEEL THRU JOINT. BEVEL EXPOSED EDGES 3/4" AND SEAL JOINT.

LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.



PLAN

(SHOWING BAR STEEL REINFORCEMENT)

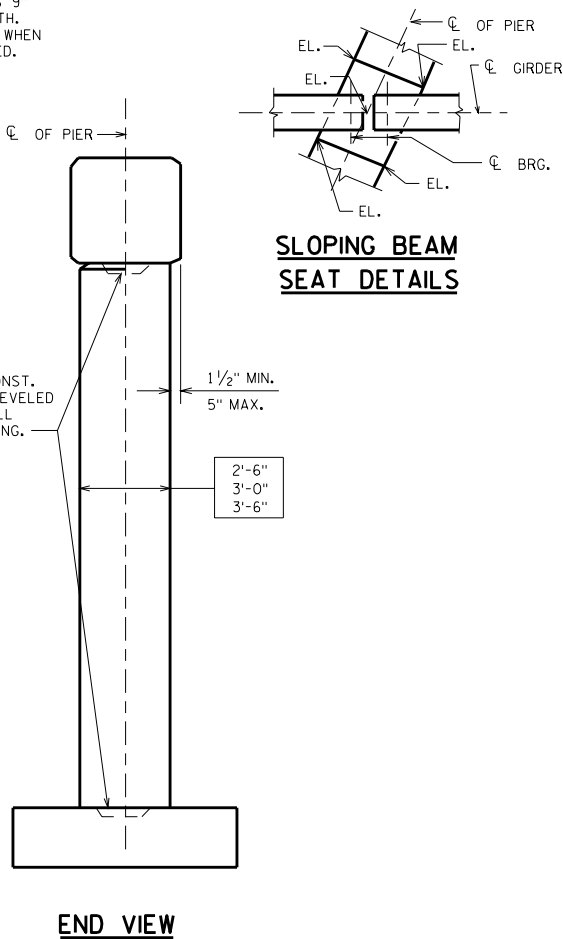


WING DETAIL FOR SKEWED STRUCTURES

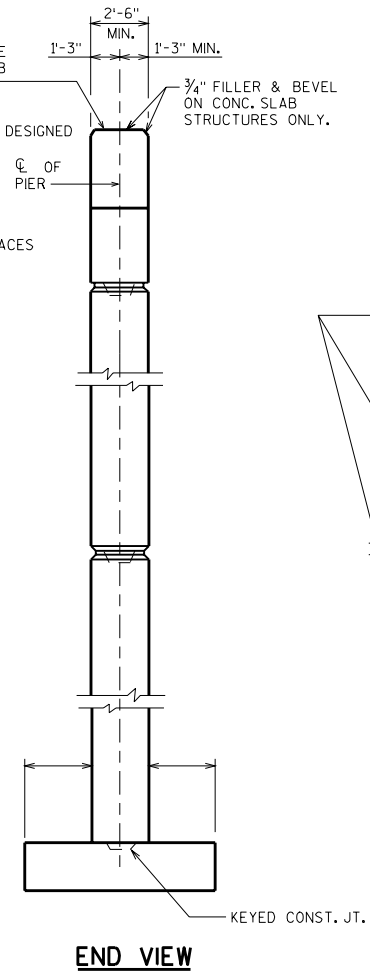
ABUTMENT A5 (INTEGRAL, PILE ENCASED ABUTMENT)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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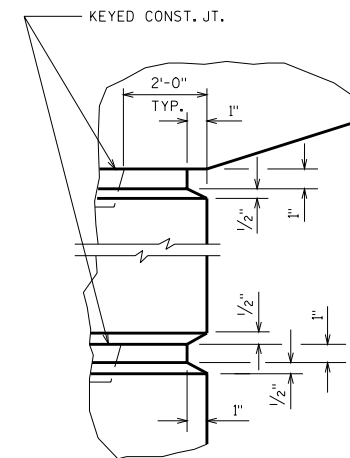
APPROVED: _____ DATE: 1-02



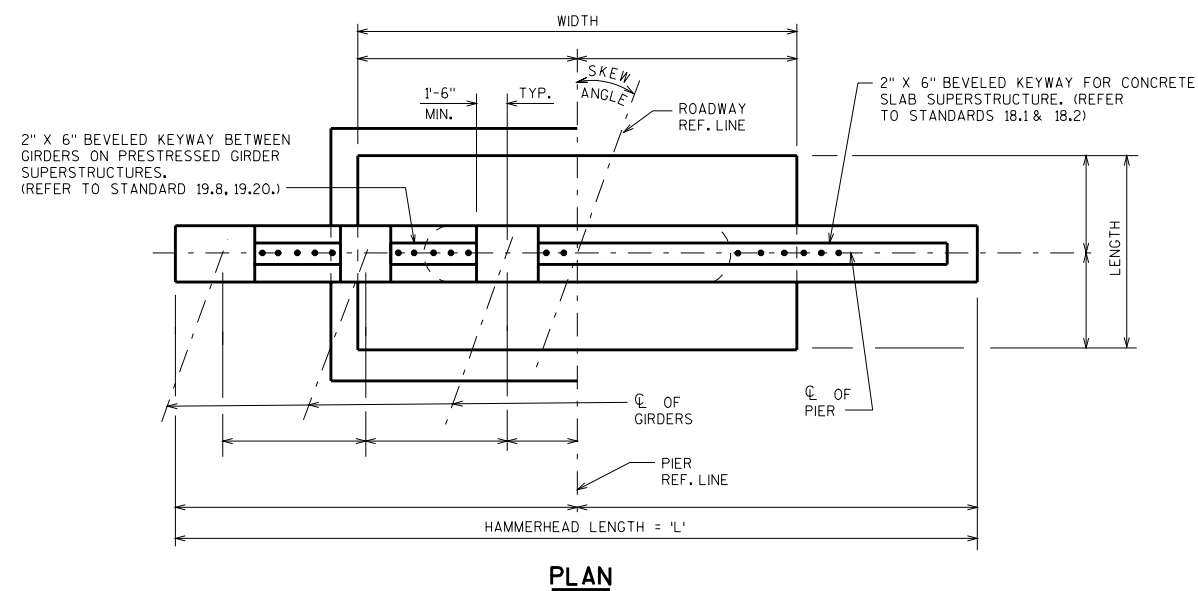
CONCRETE SLAB STRUCTURES



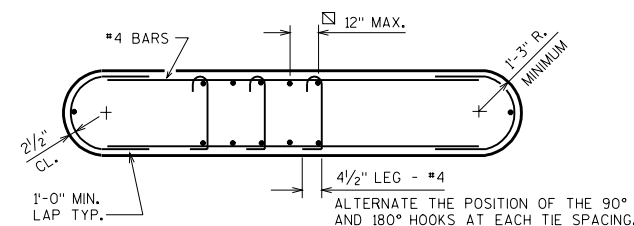
CONST. JT.
DETAIL



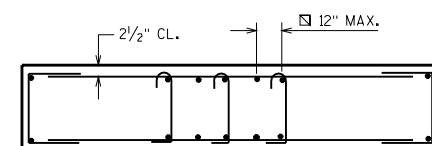
END VIEW



SECTION P1



ALTERNATE SECTION P1



[NOTE 1] MINIMUM STEP TO BE 0.02 FT. FOR ELASTOMERIC BEARING PADS AND 0.04 FT. FOR STEEL BEARINGS, IF LESS, DETAIL ELASTOMERIC BEARINGS AT SAME ELEVATION (LOWER ONE) OR DETAIL STEEL SHIM PLATE FOR STEEL BEARING. SHOW LOCATION AND SIZE OF SHIM IN "PLAN VIEW". AT THE DESIGNERS OPTION A SLOPE MAY BE USED BETWEEN BEAM SEATS.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT SHALL BE PLACED APPROXIMATELY 2'-0" ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINT IN SHAFT SHALL BE USED IN ORDER THAT MAXIMUM HEIGHT OF POUR DOES NOT EXCEED 20 FEET. RUSTICATIONS SHOWN IN "CONST. JT. DETAIL" MAY BE OMITTED AT THE OPTION OF THE DESIGNER.

KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED
KEYWAY 4" DEEP X 1/3 THICKNESS OF SHAFT X 4'-0"
LESS THAN LENGTH OF SHAFT.

✧ A STANDARD SHAFT TAPER OF 10% MAY BE USED AT THE OPTION OF THE DESIGNER. (LATERAL DIRECTION ONLY)

SHAFT MAY BE TAPERED IN ONE OR TWO DIRECTIONS WHEN REQUIRED FOR STRUCTURAL REASONS.

A NON-STANDARD SHAFT CROSS-SECTION, SHAPE, OR TAPER, NOT REQUIRED FOR STRUCTURAL REASONS, MAY BE USED ONLY WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

SEE BRIDGE MANUAL FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 4 INCHES OR MORE ABOVE THE LOWEST BEAM SEAT.

* INCREASE THIS DIMENSION IF NECESSARY TO PREVENT BATTERED
PILES FROM DRIVING INTO SHEET PILING.

☐ THIS MAXIMUM SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA. VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS LESS THAN 0.01 TIMES GROSS CONCRETE AREA AND VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

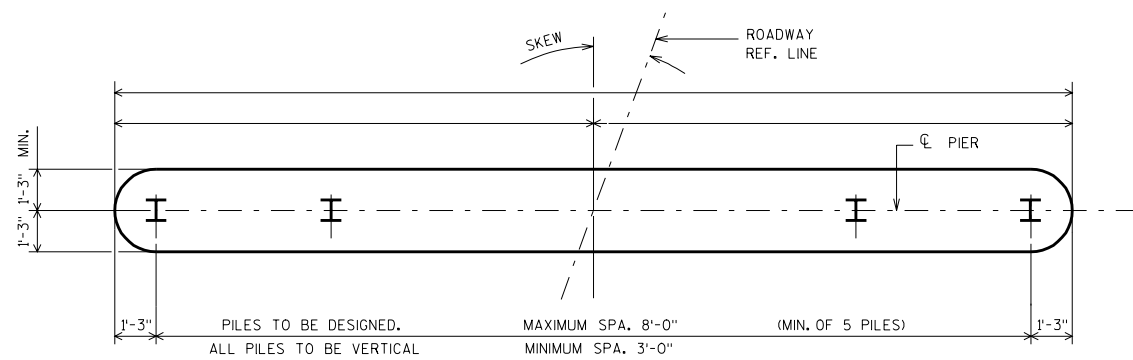
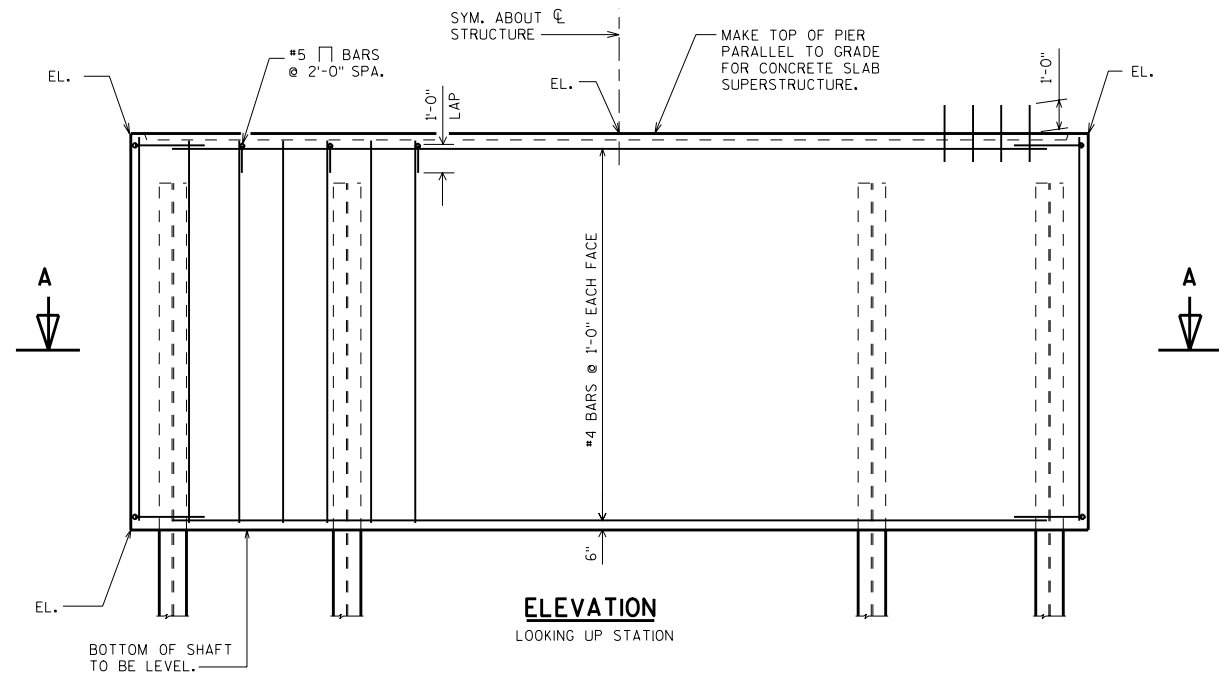
SEE STANDARD 13.1 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.

EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS & MEDIAN PIERS AT GRADE SEPARATIONS WHERE ADT UNDER THE BRIDGE IS GREATER THAN 3500.

HAMMERHEAD PIER

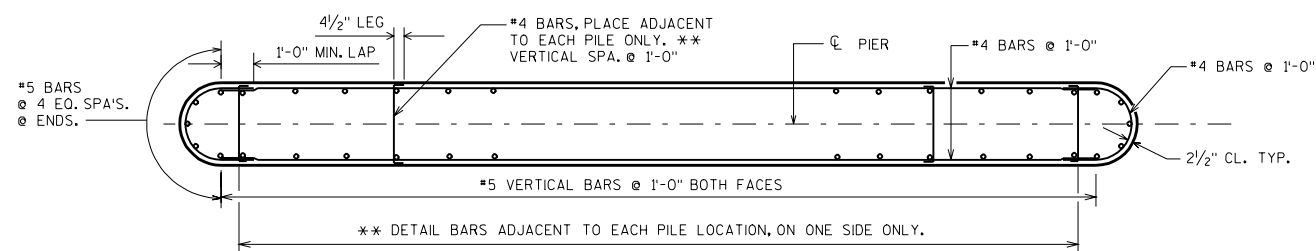
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____	DATE: 1/03
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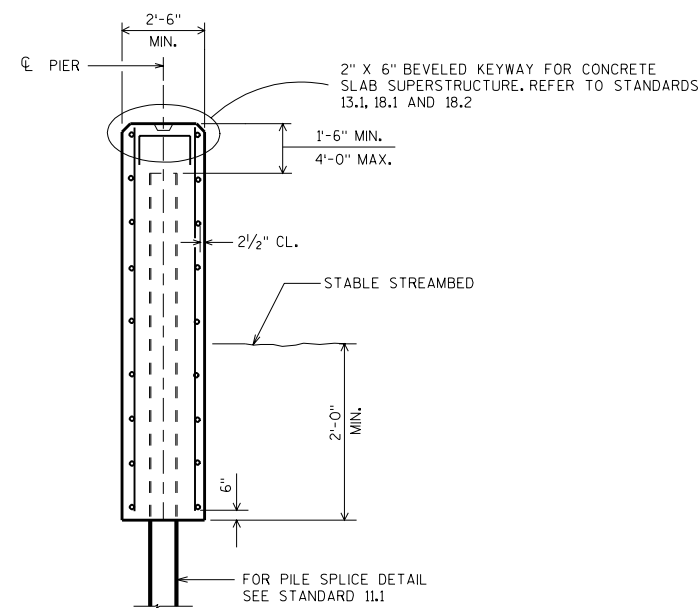


PLAN

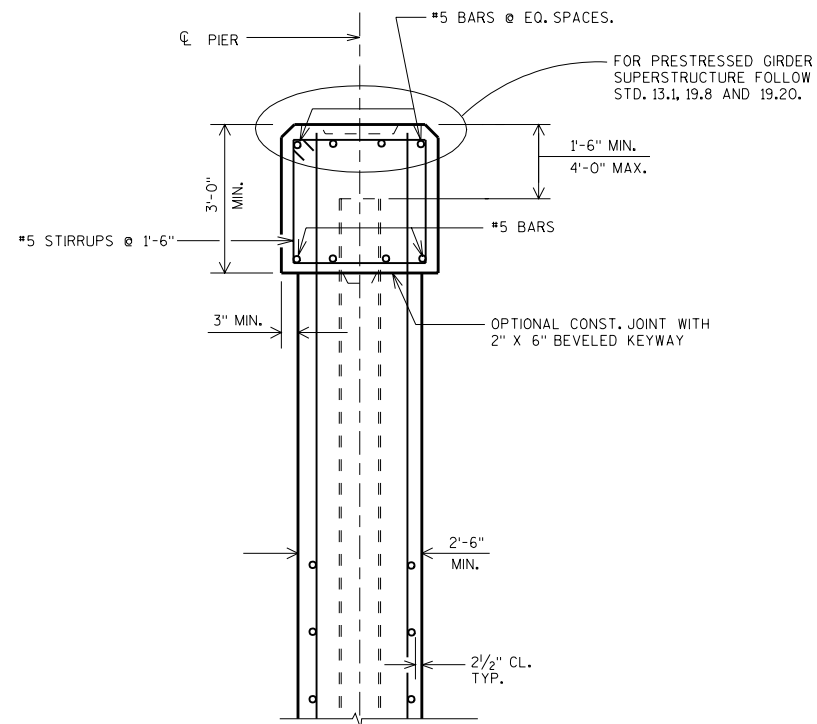
STEEL PILING SHOWN. CAST IN PLACE
CONC. PILING LAYOUT SIMILAR.



SECTION A



END VIEW



CAP TYPE DETAIL

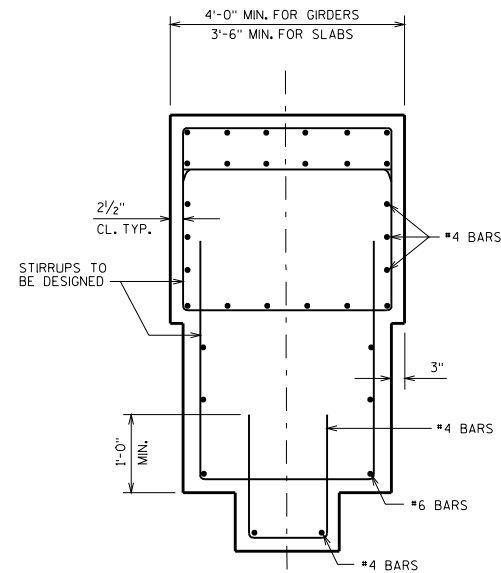
USE WHEN ECONOMICAL FOR GIRDERS
ON LARGE SKEWS.

PILE ENCASED PIER

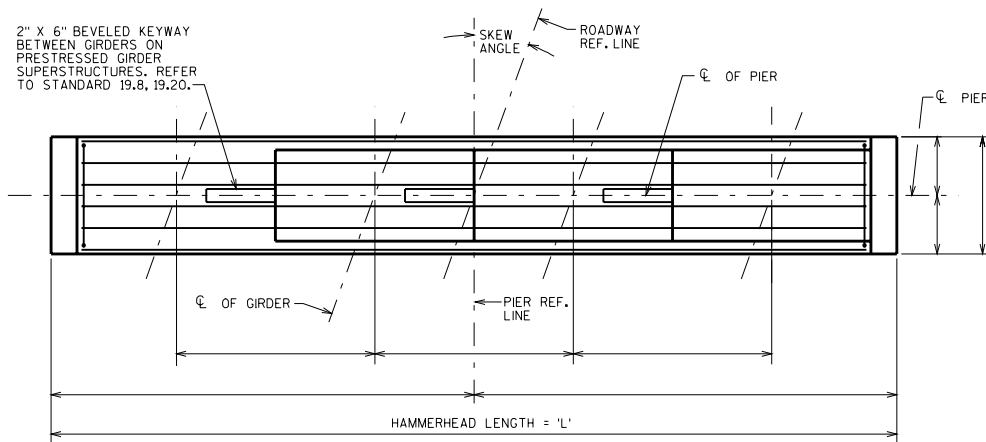
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

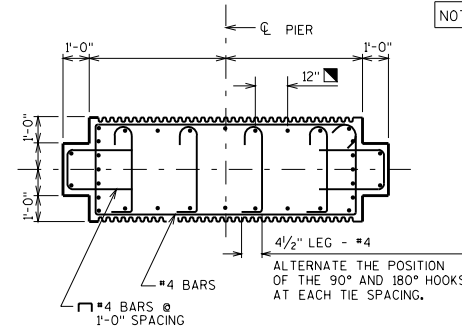
DATE:
1/03



SECTION P1



PLAN OF PIER CAP



SECTION P2

GENERAL NOTES

NOTE 1 MINIMUM STEP TO BE 0.02' FOR ELASTOMERIC BEARING PADS AND 0.04' FOR STEEL BEARINGS, IF LESS, DETAIL ELASTOMERIC BEARINGS AT SAME ELEVATION (LOWER ONE) OR DETAIL STEEL SHIM PLATE FOR STEEL BEARING. SHOW LOCATION AND SIZE OF SHIM IN "PLAN VIEW". AT THE DESIGNERS OPTION, A SLOPE MAY BE USED BETWEEN BEAM SEATS.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT SHALL BE PLACED APPROXIMATELY 2'-0" ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINT IN SHAFT SHALL BE USED IN ORDER THAT MAXIMUM HEIGHT OF POUR DOES NOT EXCEED 20'-0".

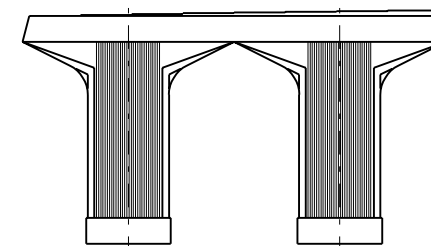
KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED KEYWAY 4" DEEP X 1/3 THICKNESS OF SHAFT X 4'-0" LESS THAN LENGTH OF SHAFT. EXPOSED EDGES OF CONSTRUCTION JOINT SHALL BE FLUSH AND NOT BEVELED.

SEE BRIDGE MANUAL FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS THAT ARE 4" OR MORE ABOVE LOWEST BEAM SEAT.

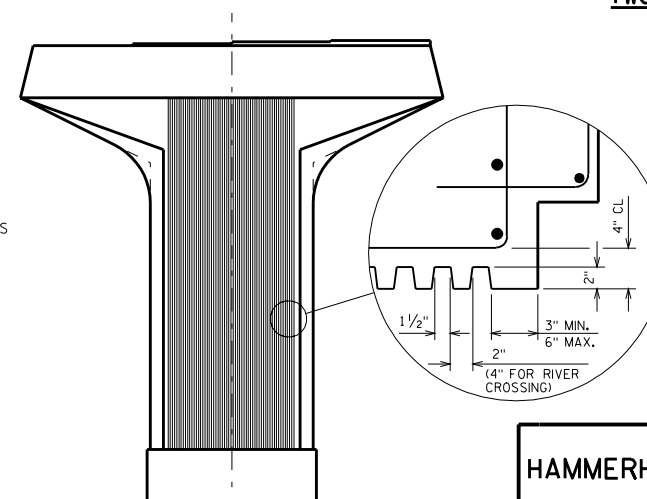
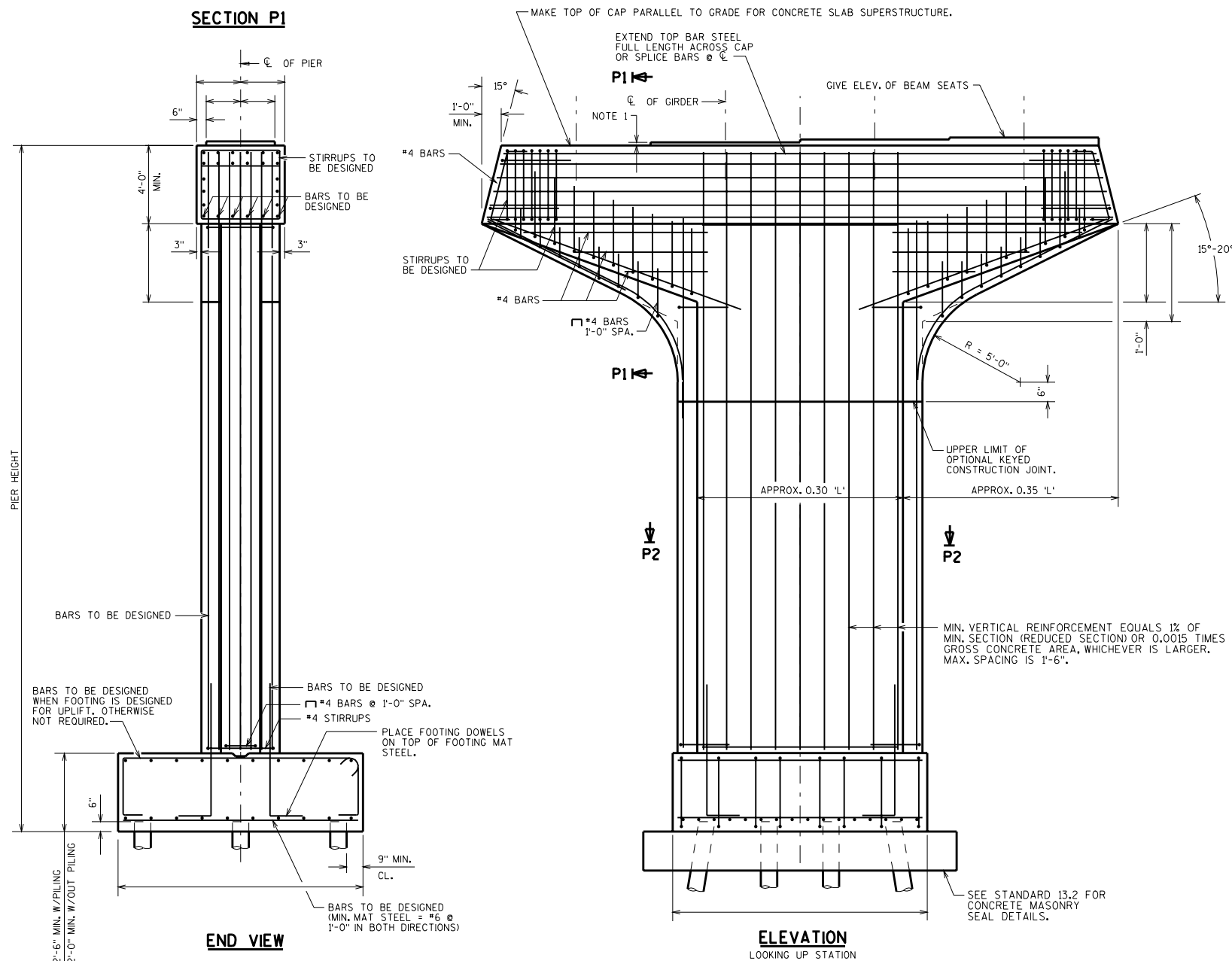
THIS MAXIMUM SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA. VERTICAL REINFORCEMENT NEED NOT BE ENCLOSED BY LATERAL TIES IF VERTICAL REINFORCEMENT AREA IS LESS THAN 0.01 TIMES GROSS CONCRETE AREA AND VERTICAL REINFORCEMENT IS NOT REQUIRED AS COMPRESSION REINFORCEMENT.

FOR "HAMMERHEAD LENGTH" GREATER THAN 45'-0", CONSIDER A TWO SHAFT PIER FRAME RESEMBLING TWO HAMMERHEAD PIERS PLACED SIDE BY SIDE.

SEE STANDARD 13.1 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.



TWO SHAFT PIER



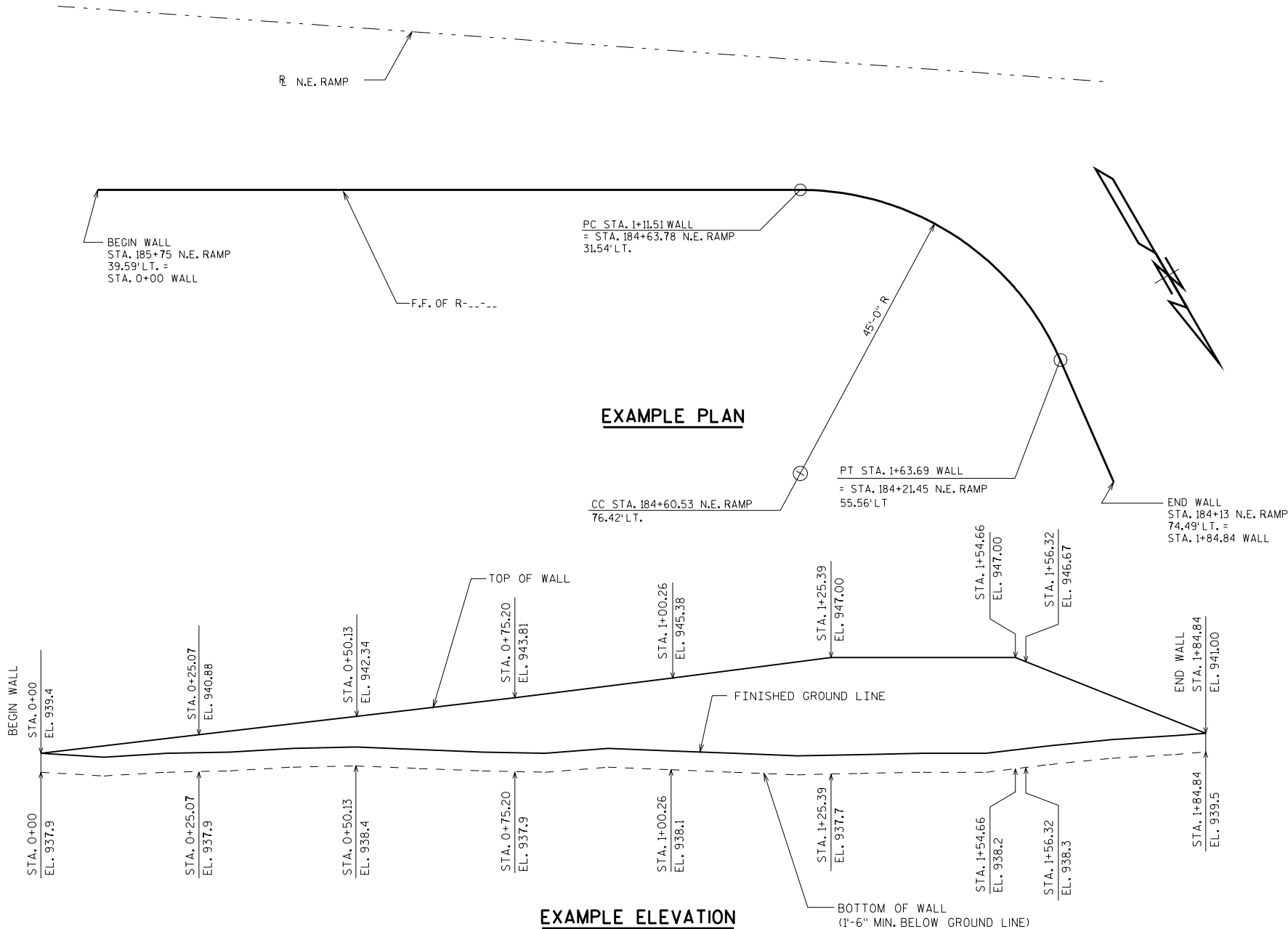
TEXTURING LIMITATIONS OF PIER WALL (EACH FACE)

HAMMERHEAD PIER - TYPE 2

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/03



EXAMPLE PLAN

EXAMPLE ELEVATION
(LOOKING @ F.F. OF WALL)

GEOMETRY TABLE

STATION	OFFSET TO F.F. WALL	COORDINATES	ELEV. A	ELEV. B

SOIL PARAMETERS

STRATUM LOCATIONS & SOIL DESCRIPTIONS	UNIT WEIGHT (pcf)	FRICTION ANGLE (DEGREES)	COHESION (psf)
EL. - EL. (SOIL TYPE)			
EL. - EL. (SOIL TYPE)			
EL. & BELOW (SOIL TYPE)			
RETAINED SOIL EL. - EL. *			

* DESIGN WALL FOR THESE VALUES

DESIGN DATA

THE CONTRACTOR SHALL PROVIDE COMPLETE DESIGN, PLANS, DETAILS, SPECIFICATIONS, AND SHOP DRAWINGS FOR THE RETAINING WALLS IN ACCORDANCE WITH THE SPECIAL PROVISIONS. THE RETAINING WALL MANUFACTURER SHALL PROVIDE TECHNICAL ASSISTANCE TO THE CONTRACTOR DURING CONSTRUCTION. THE COST OF FURNISHING THESE ITEMS SHALL BE INCLUDED IN THE BID ITEM "(INSERT WALL SYSTEM OR SYSTEMS)".

PLANS, ELEVATIONS AND DETAILS SHOWN ON THESE DRAWINGS ARE INTENDED TO INDICATE WALL LOCATIONS, LENGTHS, HEIGHTS, AND DETAILS COMMON TO THE WALL SYSTEM SELECTED. THE CONTRACTOR SHALL VERIFY THAT THE WALL SYSTEM SELECTED WILL CONFORM TO THE REQUIRED ALIGNMENTS AND DETAILS.

THE RETAINING WALL IS TO BE DESIGNED USING THE ELEVATIONS GIVEN ON THIS SHEET.

DESIGN FOR RETAINING WALL TO PROVIDE FOR FINISHED GRADE SLOPED BEHIND WALL AS SHOWN.

SEE SPECIAL PROVISIONS FOR AESTHETIC TREATMENT TO WALL.

DESIGN RETAINING WALL FOR A LIVE LOAD SURCHARGE OF (INSERT VALUE).

ALLOWABLE WALL SYSTEMS

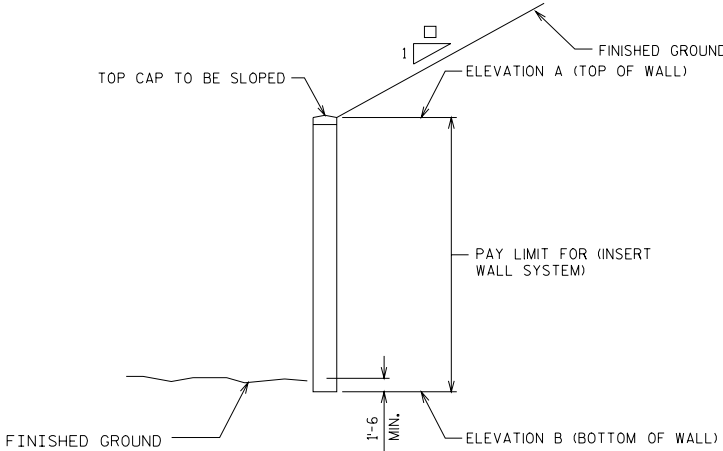
- 1.
- 2.

TOTAL ESTIMATED QUANTITIES

(INSERT WALL SYSTEM) ----- S.F.

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.



TYP. CROSS SECT. OF RETAINING WALL

SAFETY FACTORS

MINIMUM DOT STANDARD	(INSERT WALL SYSTEM)
SLIDING (FS>1.5)	
OVERTURNING (FS>2.0)	
GLOBAL STABILITY (FS>1.3)	
ULTIMATE BEARING CAPACITY (FS>2) BASED ON WALL WIDTHS & IMBEDMENT DEPTHS SHOWN IN TABLE	

BRIDGE OFFICE CONTACT:

PROPRIETARY RETAINING WALLS (GENERAL PLAN)

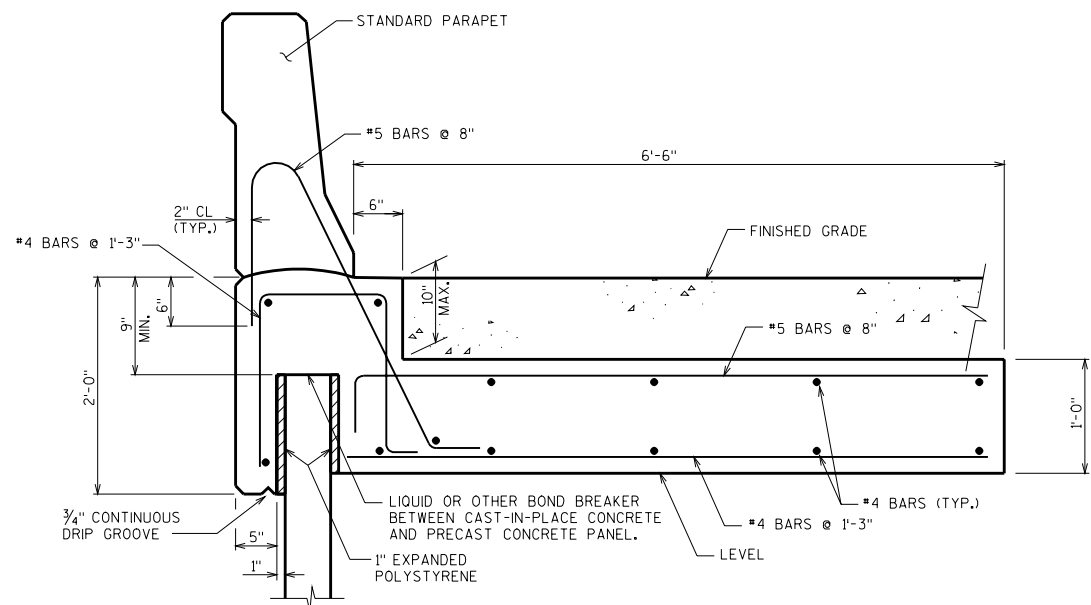
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1-02

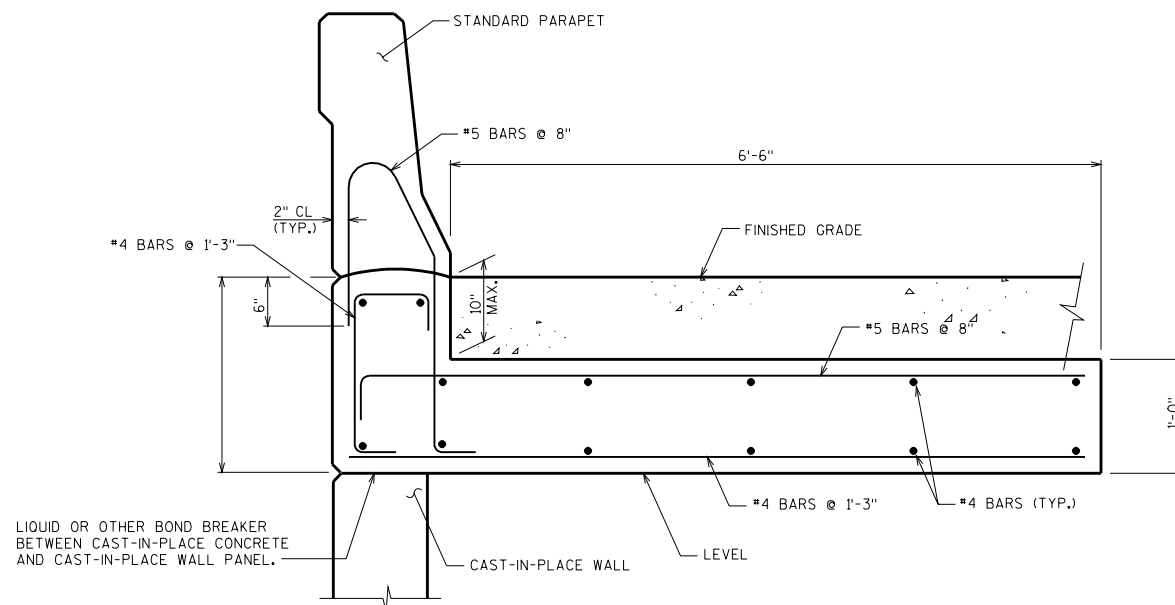
LIST OF DRAWINGS

1. (INSERT WALL SYSTEM)
2. SUBSURFACE EXPLORATION



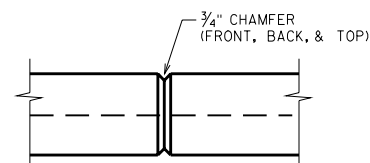
CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR PRECAST WALL PANELS

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND FOOTING MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. LAP LONGITUDINAL BARS A MINIMUM OF 1'-9". DEFINE CONSTRUCTION JOINT WITH A 3/4" "V" GROOVE.



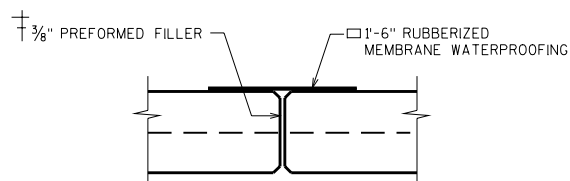
CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR CAST-IN-PLACE WALL PANELS

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND FOOTING MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. LAP LONGITUDINAL BARS A MINIMUM OF 1'-9". DEFINE CONSTRUCTION JOINT WITH A 3/4" "V" GROOVE.



COPING CONTRACTION JOINT

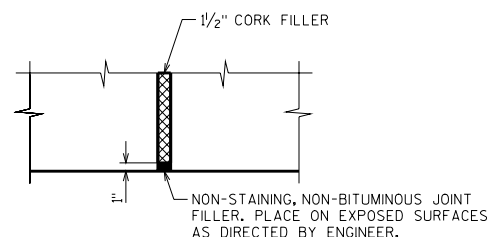
DO NOT RUN BAR STEEL THRU JOINT. MAX. SPACING OF JOINT = 12'



COPING EXPANSION JOINT

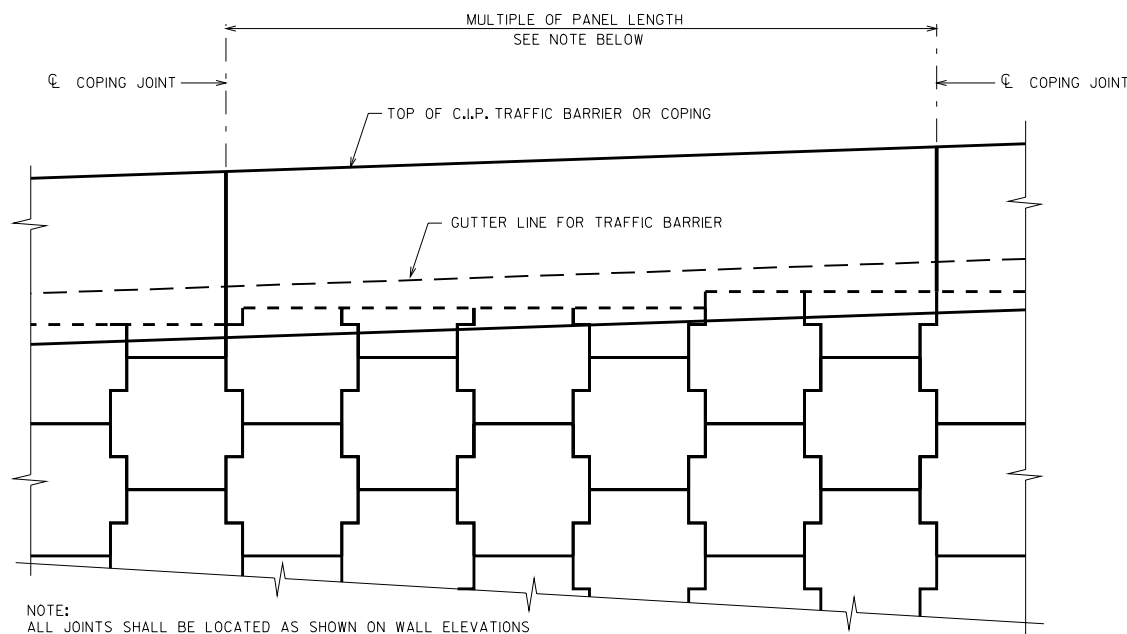
DO NOT RUN BAR STEEL THRU JOINT. MAX. SPACING OF JOINT = 50'
 † SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONC.)

□ MEMBRANE WATERPROOFING TO EXTEND FROM TOP OF COPING TO 6' BELOW TOP OF PANELS.



CONCRETE TRAFFIC BARRIER EXPANSION JOINT DETAIL

EXPANSION JOINT SPACING NOT TO EXCEED 25'. DO NOT RUN BAR STEEL THRU JOINT. LOCATE OVER WALL JOINT.



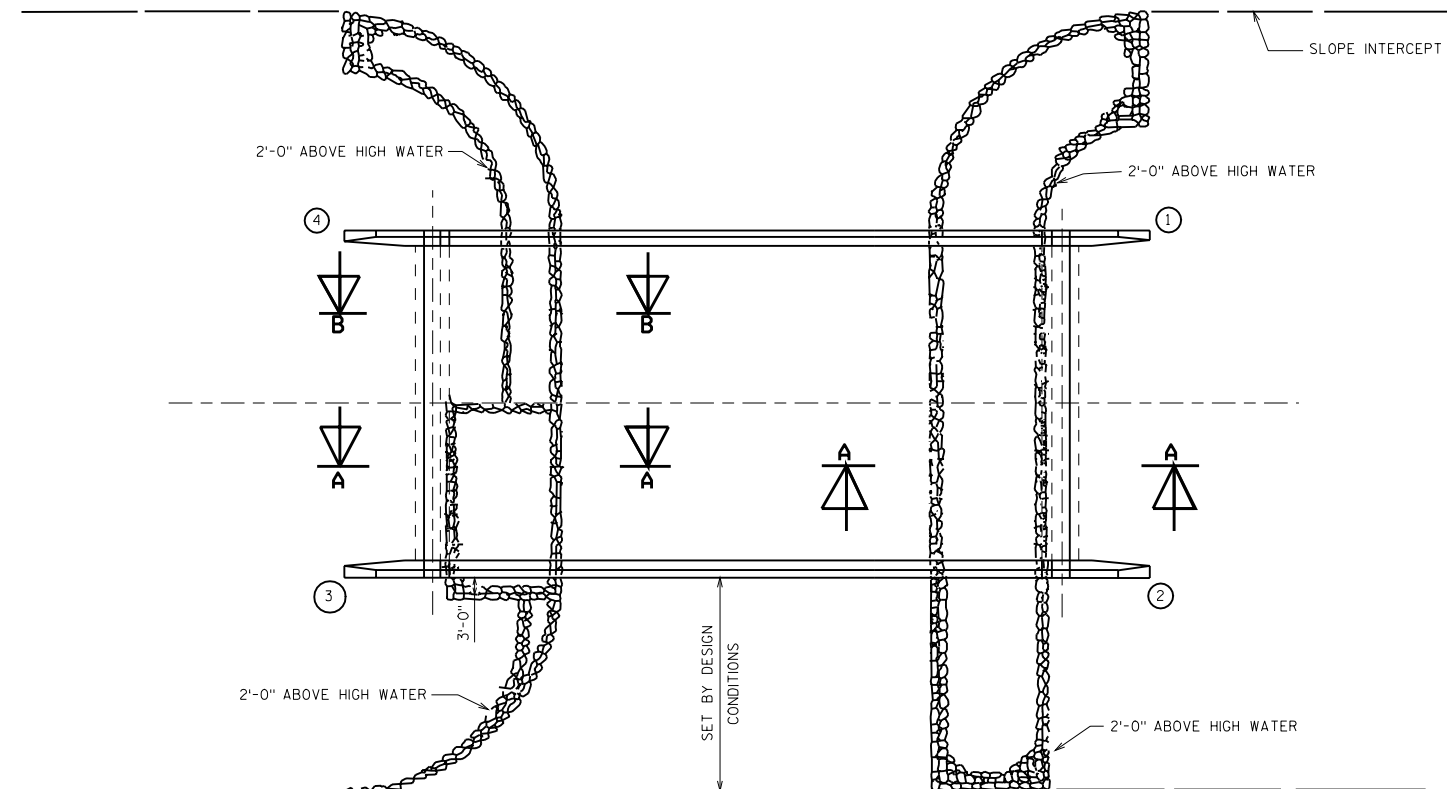
NOTE:
 ALL JOINTS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS AND MUST COINCIDE WITH PANEL JOINT ON FRONT FACE WHERE BOTTOM OF LIP INTERSECTS WITH PANEL JOINT.

C.I.P. TRAFFIC BARRIER OR COPING PARTIAL ELEVATION

MSE RETAINING WALL DETAILS

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-02

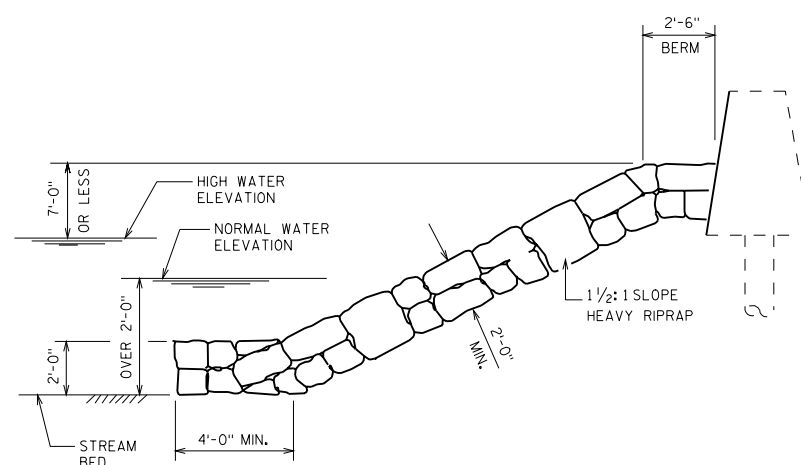


ALTERNATE ①
NORMAL CONDITION FOR EMBANKMENT FILLS

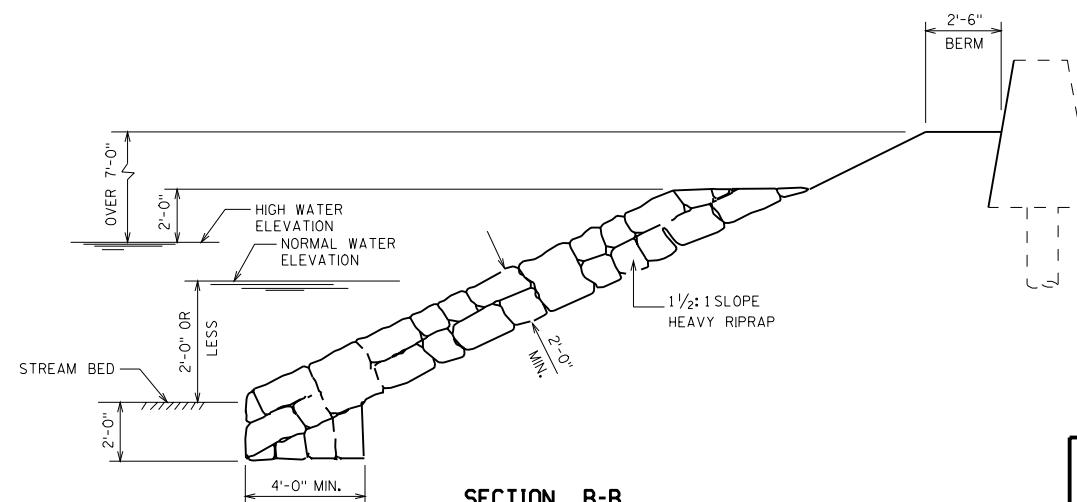
ALTERNATE ②
FOR CHANNEL CHANGE CONDITION

ALTERNATE ③
USE WHERE BERM ELEVATION IS LESS THAN
7'-0" ABOVE HIGH WATER

ALTERNATE ④
USE WHERE BERM ELEVATION IS OVER
7'-0" ABOVE HIGH WATER



SECTION A-A



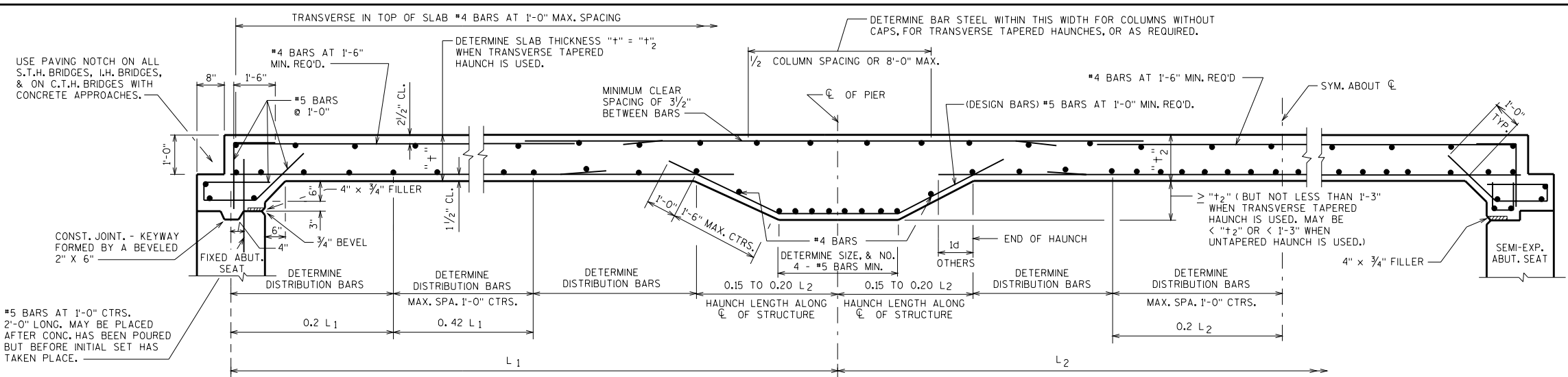
SECTION B-B

**PLACEMENT OF HEAVY RIPRAP
AT RIVER CROSSINGS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99



LONGITUDINAL SECTION

NOTES

TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

PARAPETS SHOWN ABOVE THE HORIZONTAL CONSTRUCTION JOINT SHALL BE POURED AFTER FALSEWORK HAS BEEN RELEASED EXCEPT FOR STAGE CONSTRUCTION.

CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION & FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.

▲ 3/4" CONTINUOUS DRIP GROOVE TO END 2'-0" AWAY FROM FACE OF ABUTMENT.

DESIGNER NOTES

THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

USE OPTIONAL LONGITUDINAL JOINTS WHEN ROADWAY WIDTH IS OVER 52'-0". SEE STANDARD 18.2 FOR DETAIL.

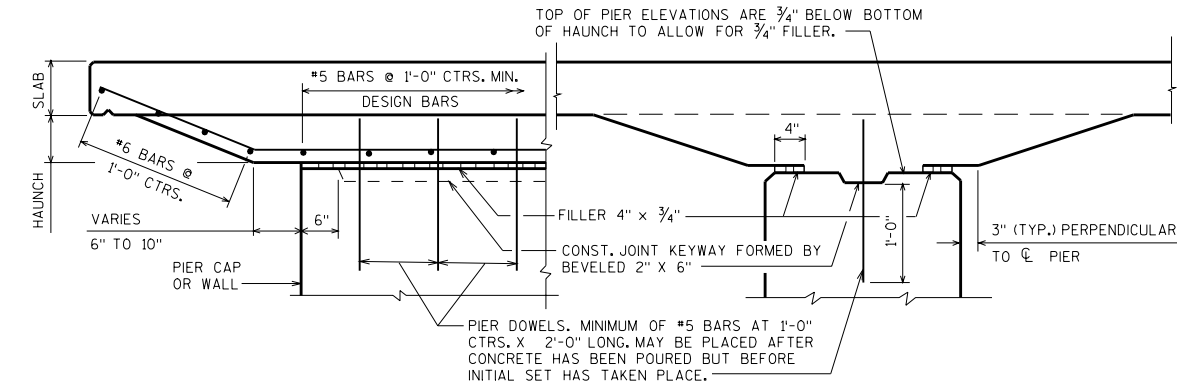
FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT WHEN POUR EXCEEDS 400 C.Y. PLACE KEYED JOINT NEAR POINT OF DEAD LOAD INFLECTION.

ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.

FLOOR DRAINS ARE TO BE OMITTED FROM THESE UNITS WHERE POSSIBLE. IF FLOOR DRAINS ARE REQ'D., PLACE ONLY AT THE 2/10 & 8/10 PTS. BEND MAIN REBARS PAST DRAINS - DO NOT CUT.

☑ TRANSVERSE TAPERED HAUNCHES MAY BE USED TO ELIMINATE A COLUMN (PROVIDED A MINIMUM OF 3 COL'S. ARE USED), OR FOR AESTHETICS.

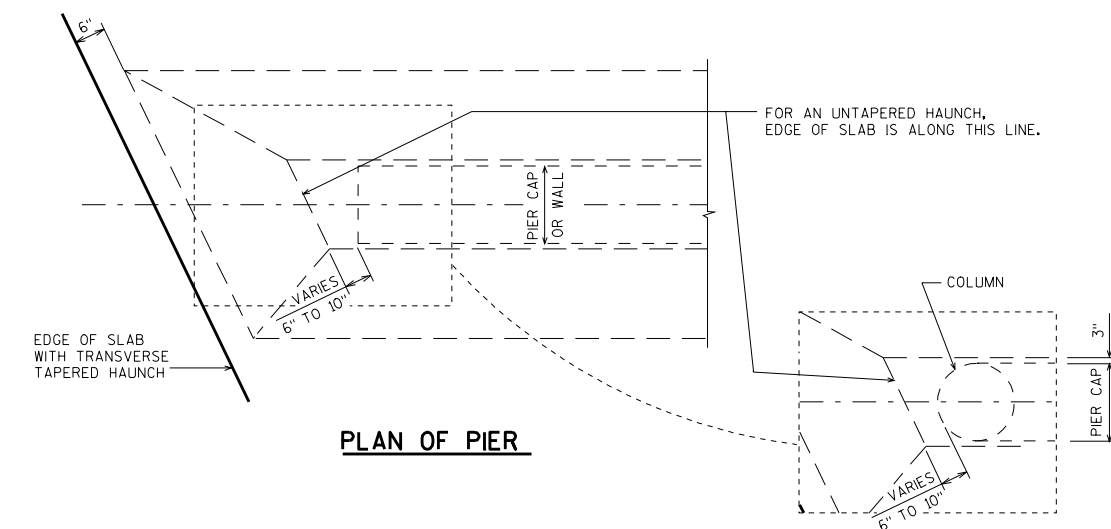
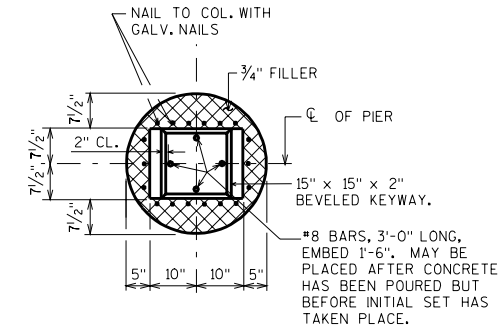
PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES. COLUMN W/O CAP TYPE PIERS MAY BE USED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.



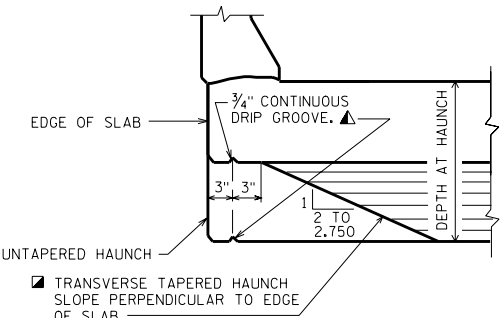
PIER CAP OR WALL TYPE PIER

SHOWING TRANSVERSE TAPERED HAUNCH

**COLUMN W/O CAP TYPE PIER
DETAIL AT TOP OF COLUMN**



PLAN OF PIER



**TAPERED/UNTAPERED HAUNCH
CROSS SECTION**

CONTINUOUS HAUNCHED SLAB	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 7/99



TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES
NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

PARAPETS SHOWN ABOVE THE HORIZONTAL CONSTRUCTION JOINT SHALL BE
POURED AFTER FALSEWORK HAS BEEN RELEASED EXCEPT FOR STAGE
CONSTRUCTION.

CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION & FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.

▲ 3/4" CONTINUOUS DRIP GROOVE TO END 2'-0" AWAY FROM FACE OF ABUTMENT.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

USE OPTIONAL LONGITUDINAL JOINTS WHEN ROADWAY WIDTH IS OVER 52'-0".

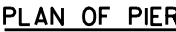
FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT WHEN POUR EXCEEDS 400 C.Y. PLACE KEYED JOINT NEAR POINT OF DEAD LOAD INFLECTION.

ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.

FLOOR DRAINS ARE TO BE OMITTED FROM THESE UNITS WHERE POSSIBLE.
IF FLOOR DRAINS ARE REQ'D., PLACE ONLY AT THE 2/10 & 8/10 PTS. BEND
MAIN REBARS PAST DRAINS - DO NOT CUT.

PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES. COLUMN W/O CAP TYPE PIERS (SEE STD. 18.1) MAY BE USED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.



CONTINUOUS FLAT SLAB	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 7/99



DETAIL TYP. AT EACH END



SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

DESIGNER NOTES

THE MAX. NUMBER OF DRAPED 0.5" ϕ STRANDS IS 12 AND FOR 0.6" ϕ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. USE ONLY 0.5" ϕ STRAND FOR THE DRAPED PATTERN. USE 0.6" ϕ FOR THE STRAIGHT PATTERN.

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING
DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS
SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.
IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING
LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS
ARE AVAILABLE:

1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.

2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE
SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL
OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494

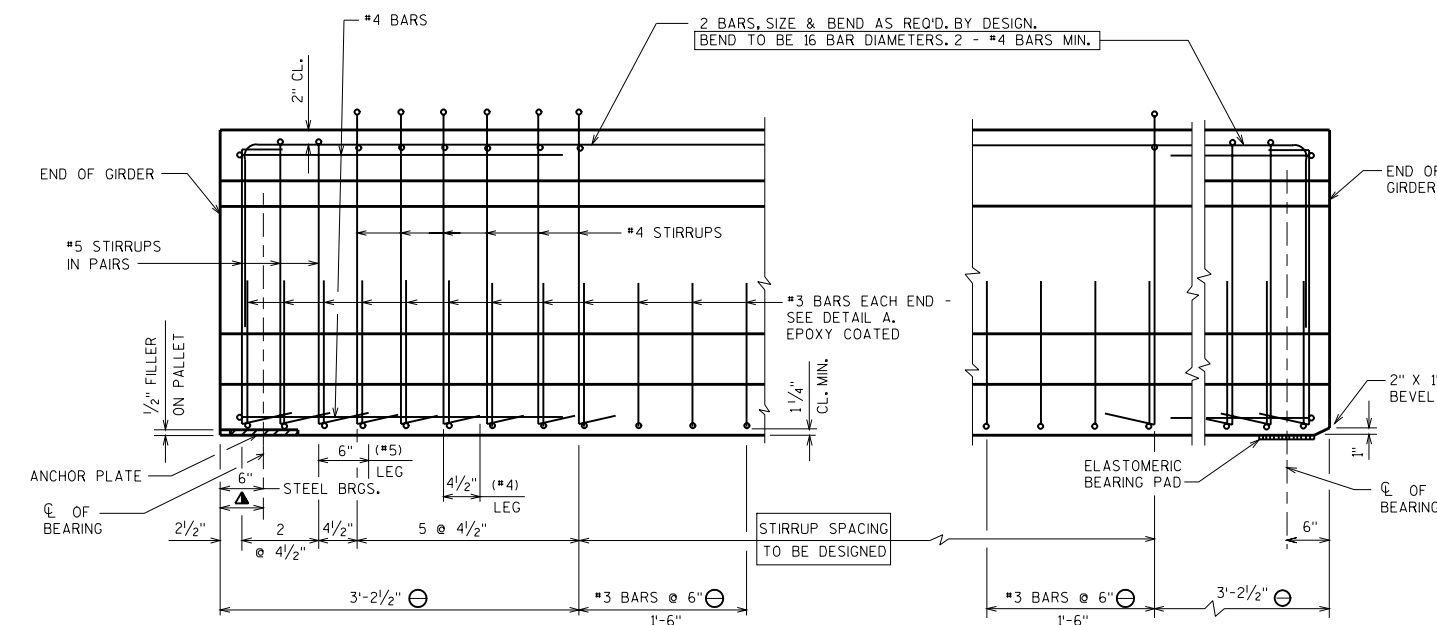
WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF
ASTM A497.



VALUES SHOWN ARE FOR STIRRUPS FOR 35' SPANS AND A 13'-3" GIRDER
SPACING, H20 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES, USE #4
BARS AT 1'-9" AS MINIMUM STIRRUP AREA.



<h2 style="margin: 0;">28" PRETENSIONED GIRDER DETAILS</h2>	
<p>STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION</p>	
<p>APPROVED: _____</p>	<p>DATE: _____ 1/03</p>



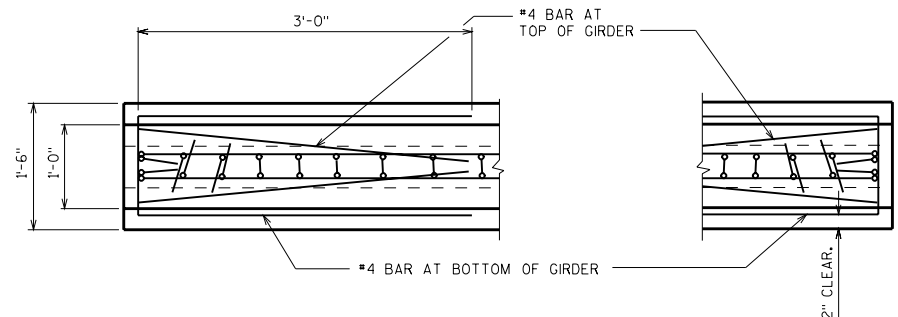
▲ VARIES FOR ELASTOMERIC BRGS. SEE STD. 27.7

SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

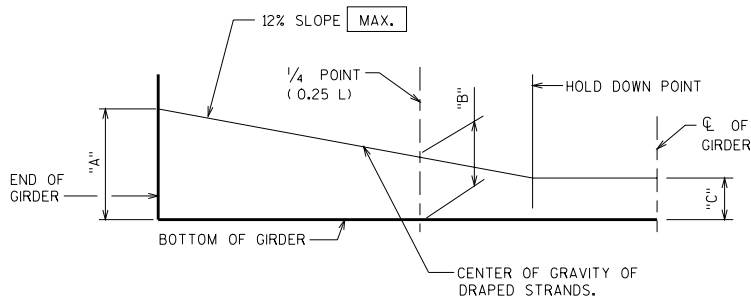
SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD

SIDE VIEW OF GIRDER

○ DETAIL TYPICAL AT EACH END.



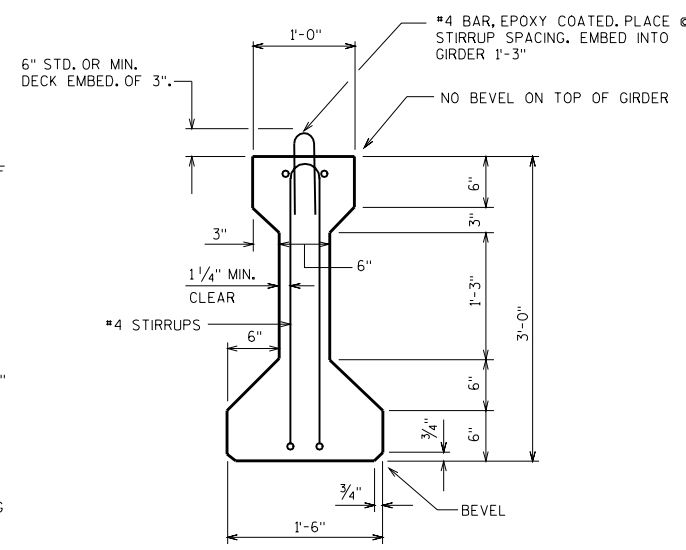
TOP VIEW OF GIRDER



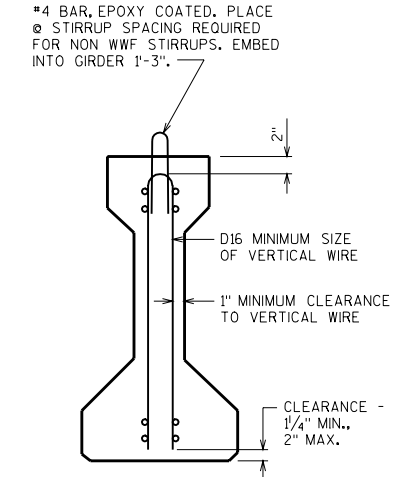
"A" TO BE GIVEN TO THE NEAREST 1"
 "B" = 1/4("A" + 3 "C") [MIN.]
 "B" = 1/4("A" + 3 "C") + 3" [MAX.]

RECORD DIMENSIONS "A", "B" & "C" ON FINAL PLANS.

LOCATION OF DRAPED STRANDS



SECTION THRU GIRDER



SECTION THRU GIRDER
 SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

DESIGNER NOTES

THE MAX. NUMBER OF DRAPED 0.5"Φ STRANDS IS 12 AND FOR 0.6"Φ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. USE ONLY 0.5"Φ STRAND FOR THE DRAPED PATTERN. USE 0.6"Φ FOR THE STRAIGHT PATTERN.

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. [THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.]

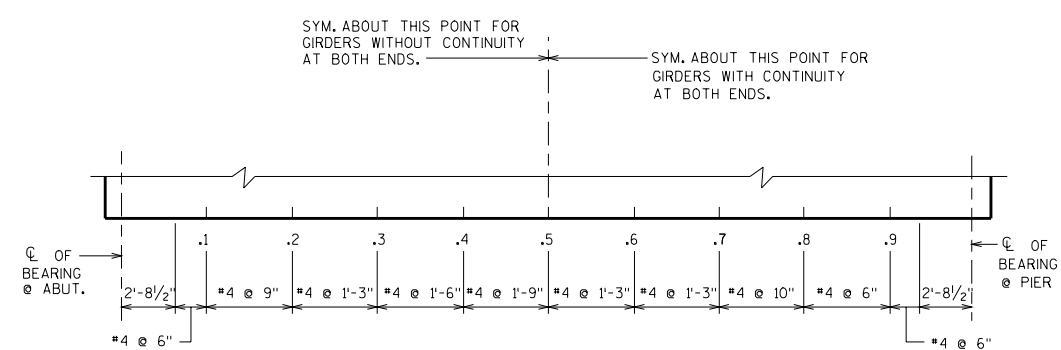
TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

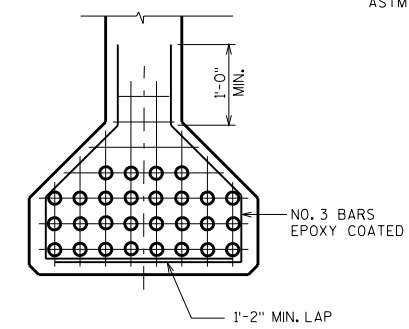
AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A497.



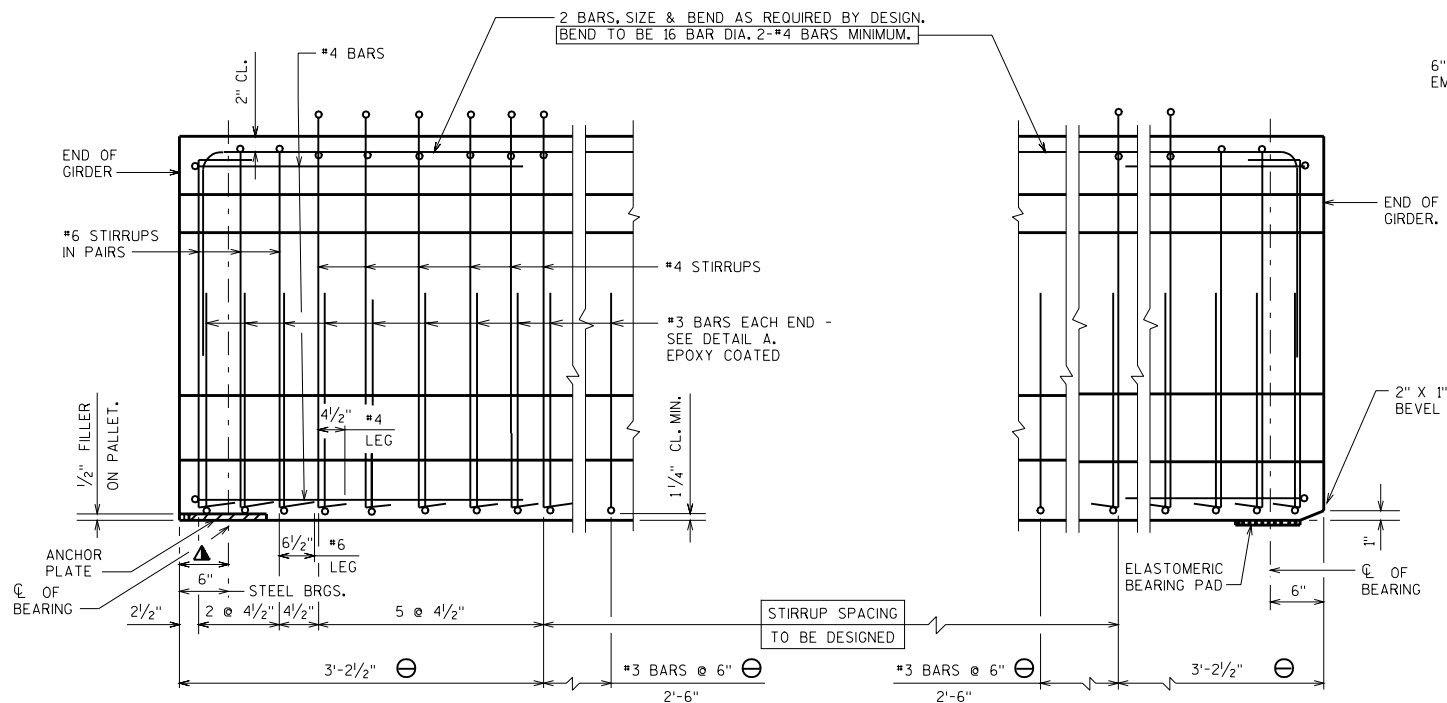
MAXIMUM STIRRUP NUMBER REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 40'-0" SPANS AND 12'-5" GIRDER SPACING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #4 BARS AT 1'-9" AS MINIMUM STIRRUP AREA. HS20 LOADING.



DETAIL A

36" PRETENSIONED GIRDER DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/03

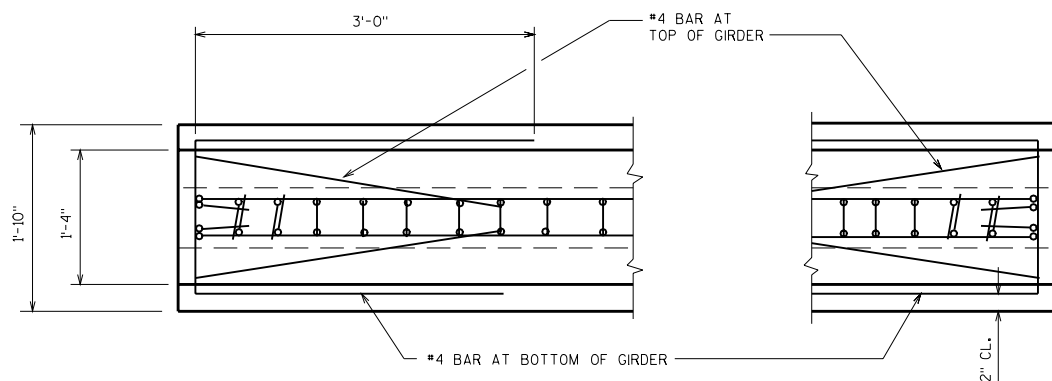


VARIES FOR ELASTOMERIC BRGS.
SEE STD. 27.7

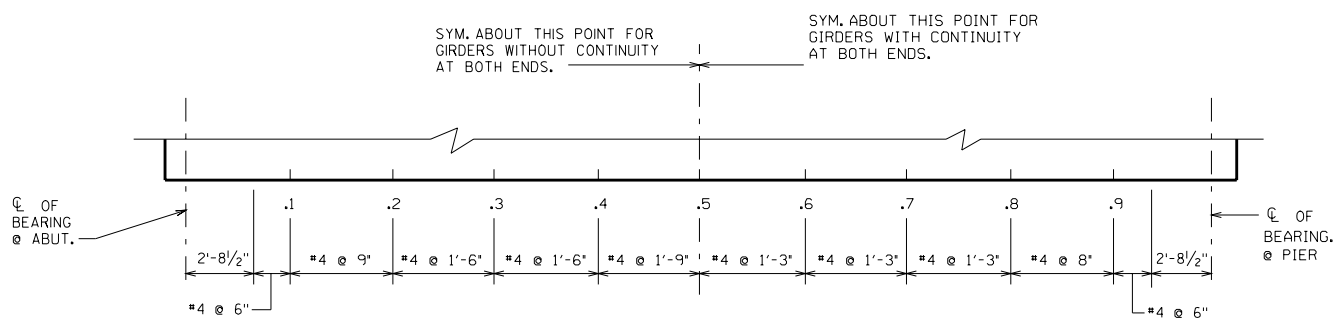
SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SIDE VIEW OF GIRDER

DETAIL TYPICAL AT EACH END

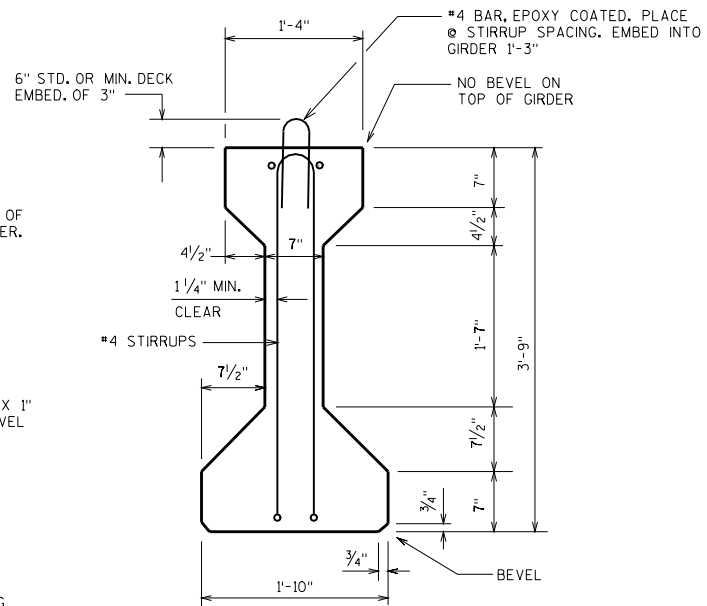


TOP VIEW OF GIRDER

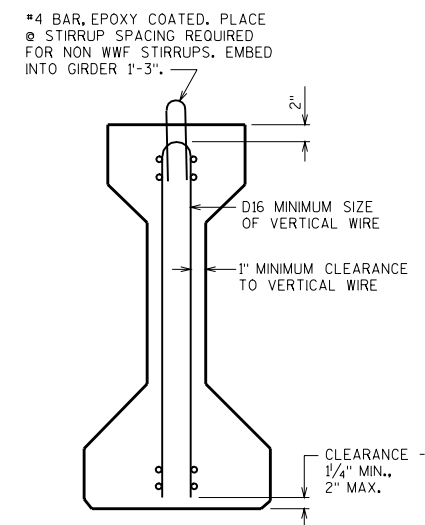


MAXIMUM STIRRUP NUMBER REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 65'-0" SPANS AND 12'-9" GIRDER SPACING, HS20 LOADING. DESIGN STIRRUPS FOR OTHER CASES, USE #4 BARS AT 1'-9" AS MINIMUM STIRRUP AREA.



SECTION THRU GIRDER



SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

DESIGNER NOTES

THE MAX. NUMBER OF DRAPED 0.5"φ STRANDS IS 12 AND FOR 0.6"φ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. USE ONLY 0.5"φ STRAND FOR THE DRAPED PATTERN. USE 0.6"φ FOR THE STRAIGHT PATTERN.

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. [THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.]

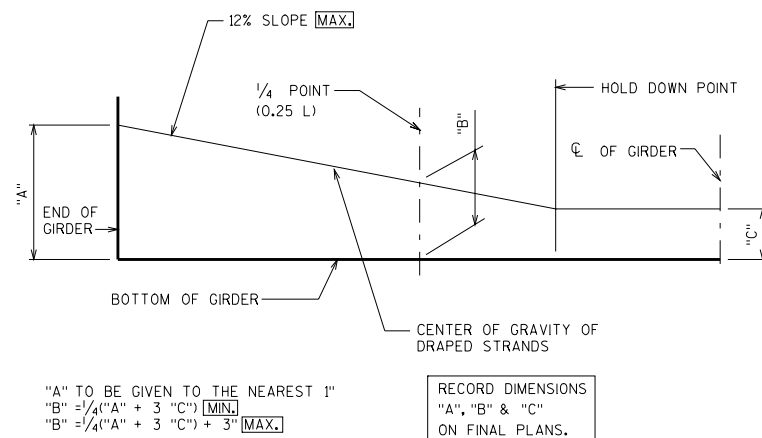
TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

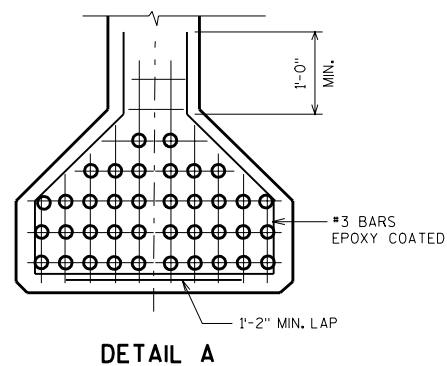
1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608)266-8494

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A497.



LOCATION OF DRAPED STRANDS



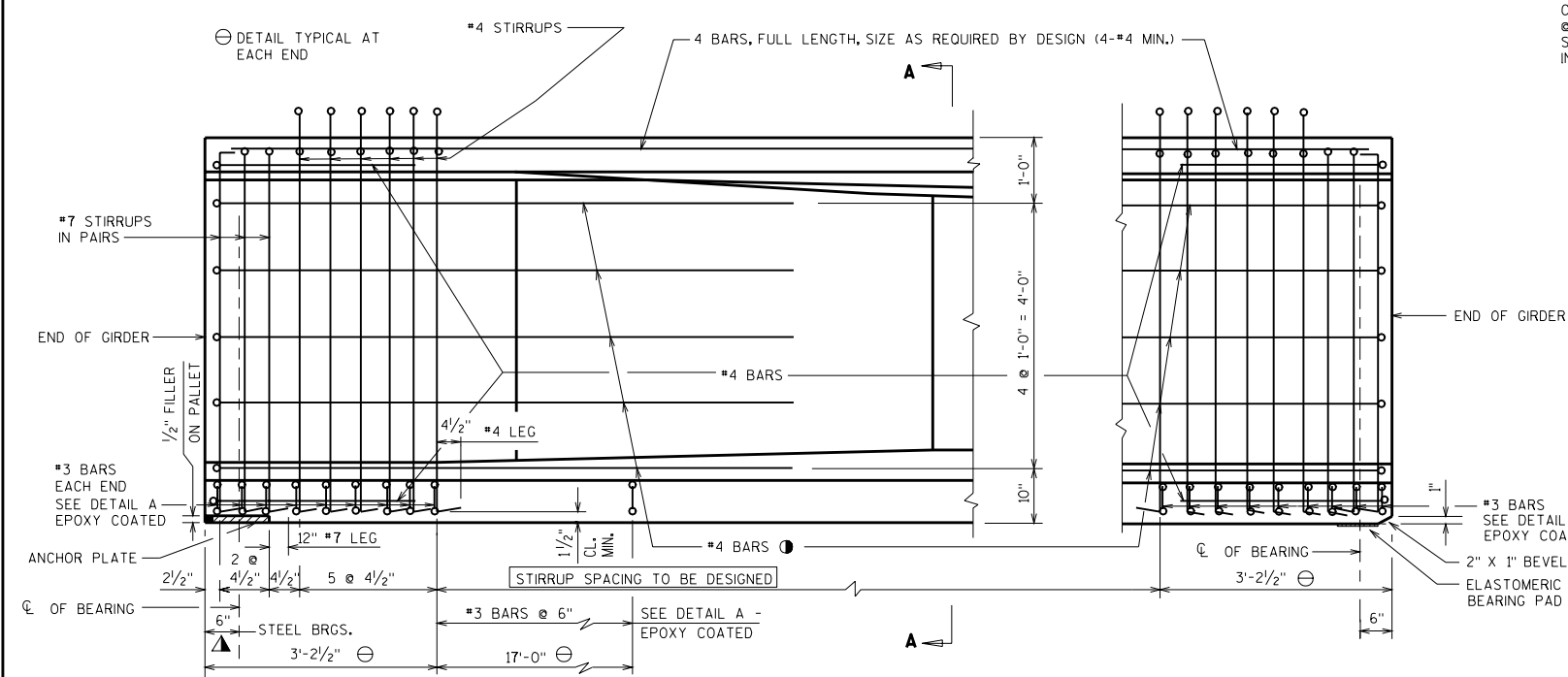
DETAIL A

45" PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/03

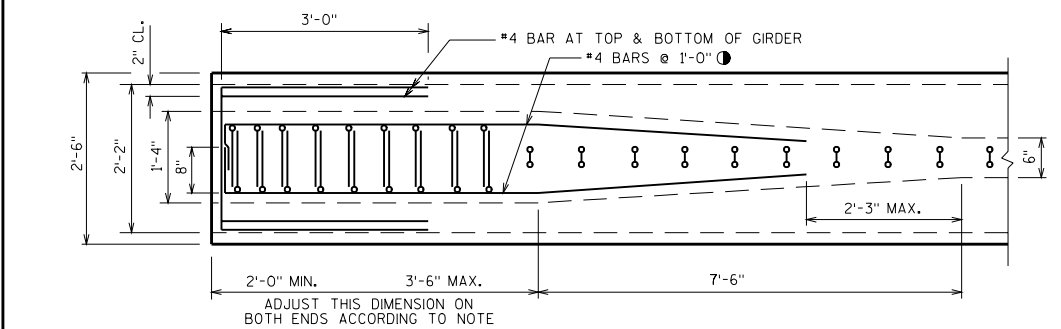


▲ VARIES FOR ELASTOMERIC BRGS. SEE STD. 27.7

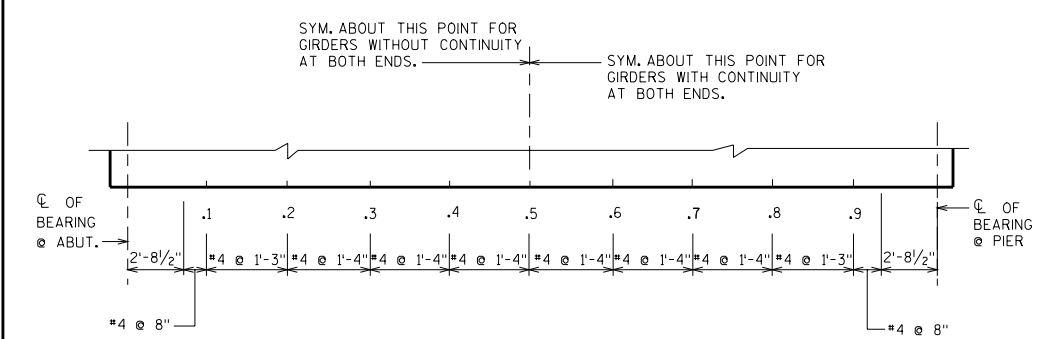
● INCREASE THE SIZE OF THESE BARS IF REQUIRED BY AASHTO LRFD 5.8.3.5

SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SIDE VIEW OF GIRDER



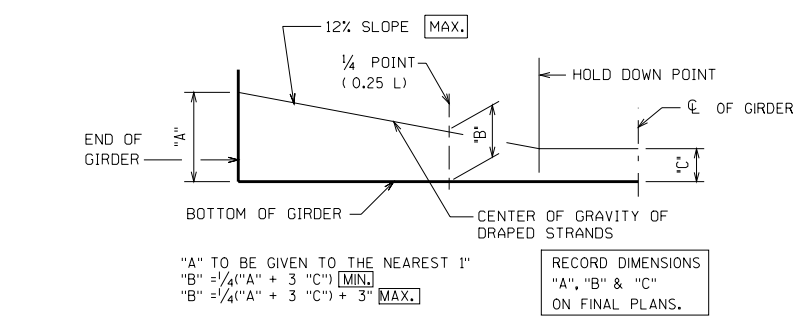
TOP VIEW OF GIRDER



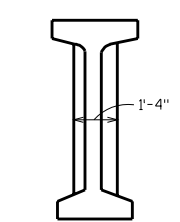
MAXIMUM STIRRUP NUMBER REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 105'-0" SPANS AND 11'-6" GIRDER SPACING, HS20 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #4 BARS AT 1'-4" AS MINIMUM STIRRUP AREA.

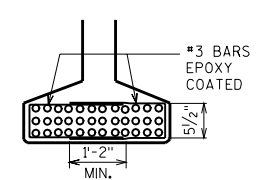
SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD



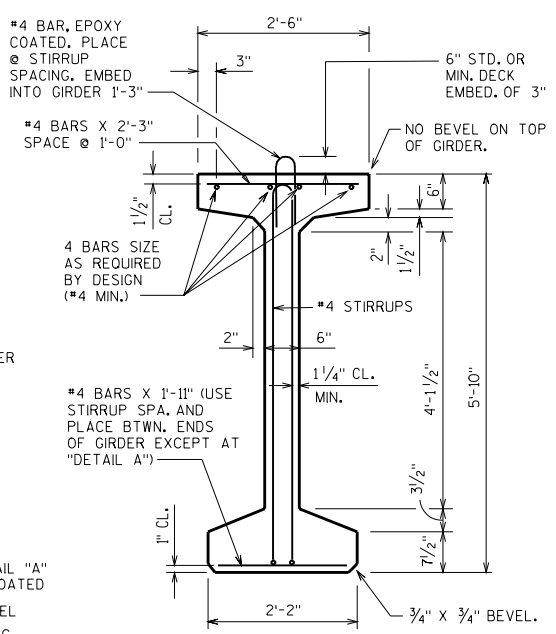
LOCATION OF DRAPED STRANDS



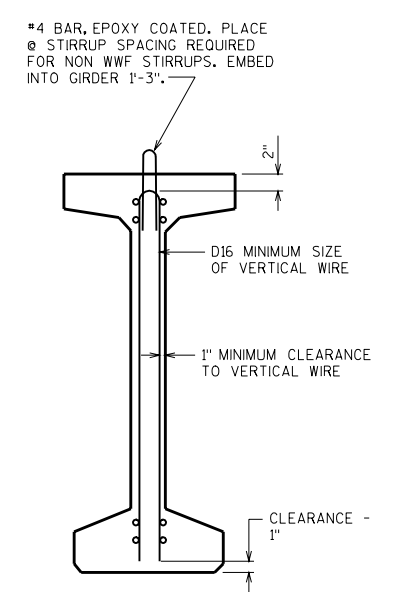
SECTION A-A



DETAIL A



SECTION THRU GIRDER



SECTION THRU GIRDER
SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

GENERAL NOTES

- THESE NOTES APPLY TO ALL GIRDERS.
- THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.
- STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.
- TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL BE TROWEL FINISHED.
- SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS ARE AVAILABLE:
1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
 2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.
- AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION. (608) 266-8494
- WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A497.
- IF THE CONTRACTOR USES THE BOTTOM FLANGE TO SUPPORT CONSTRUCTION FORMS, THE CONTRACTOR SHALL SUBMIT FALSEWORK PLANS FOR APPROVAL BY THE STRUCTURES DESIGN SECTION.

DESIGNER NOTES

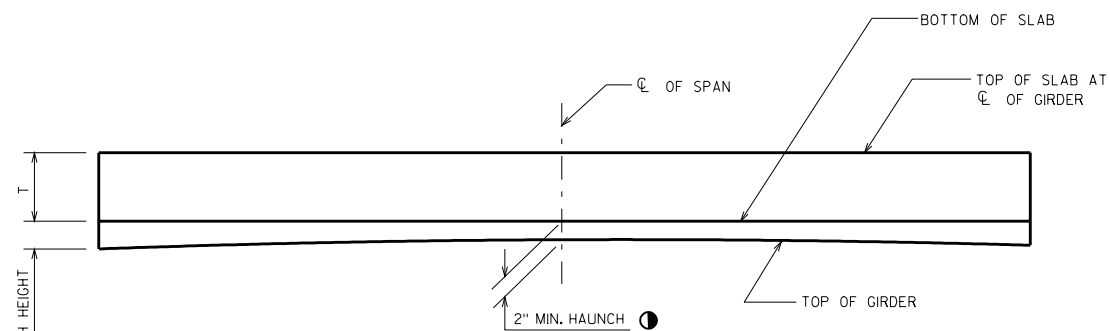
ON MULTIPLE SPAN STRUCTURES SET THE END BLOCK LENGTHS OF GIRDERS RESTING ON THE SAME PIER TO ± 2". ON SIMPLE SPANS SET THE END BLOCK LENGTH ON BOTH GIRDER ENDS TO ± 2".

THE MAX. NUMBER OF DRAPED 0.5"φ STRANDS IS 12 AND FOR 0.6"φ STRANDS THE MAX. IS 8.

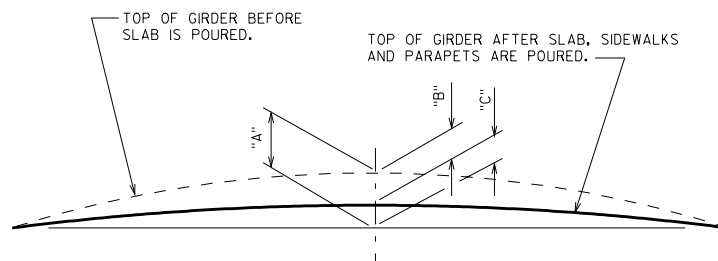
GIRDER LENGTHS IN EXCESS OF 140 FEET MAY BE CONTROLLED BY TRANSPORTATION LIMITATIONS AND REQUIRE APPROVAL BY THE PRESTRESS GIRDER MANUFACTURERS.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. USE 0.6" STRAND FOR ALL PATTERNS.

70" PRETENSIONED GIRDER DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/03



ELEVATION



CAMBER & DEFLECTION DIAGRAM

- * "A" = PRESTRESS CAMBER
- * "B" = DEAD LOAD DEFLECTION
- * "C" = RESIDUAL CAMBER
- * ROUND OFF TO NEAREST 1/8"

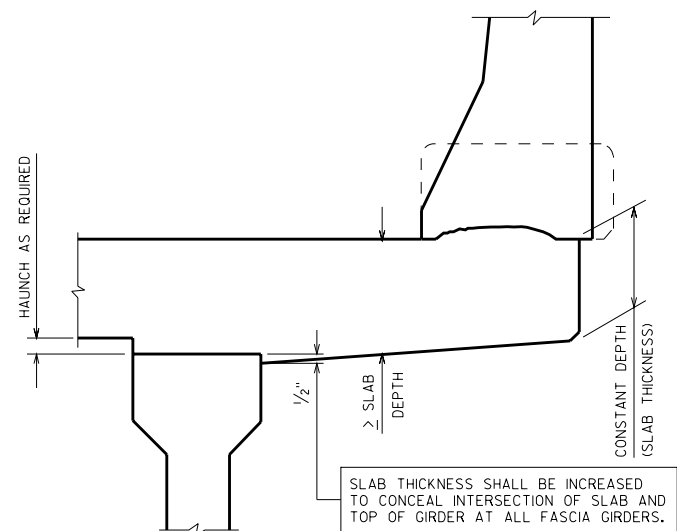
DESIGNER NOTES

- 1 PRESENT PRACTICE IS TO USE A MINIMUM "HAUNCH HEIGHT" OF 2" FOR DESIGN CALCULATIONS AND AN AVERAGE "HAUNCH HEIGHT" OF 2 1/2" FOR COMPUTING THE HAUNCH CONCRETE QUANTITY.

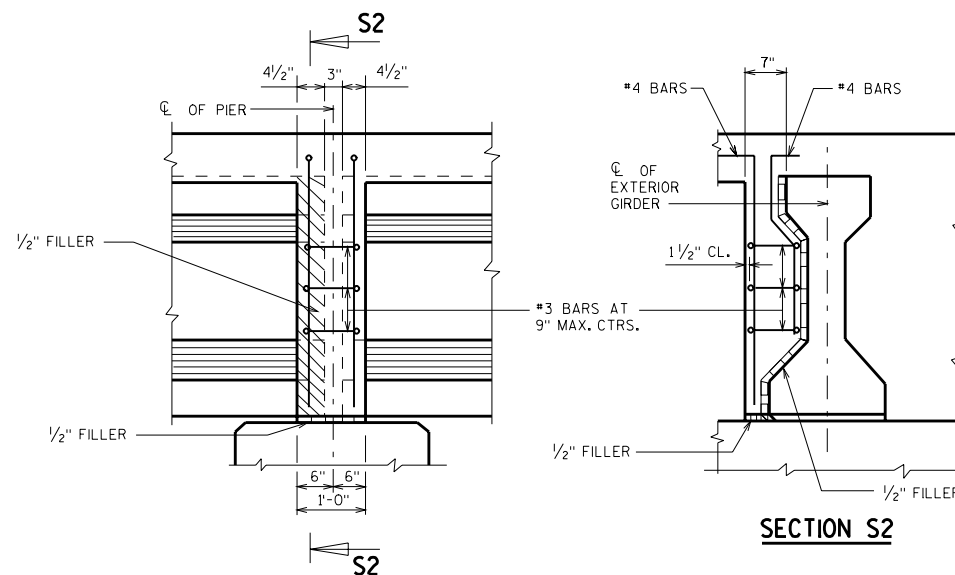
THE ACTUAL HAUNCH HEIGHTS UTILIZED SHALL BE BASED ON FIELD ELEVATIONS & DEAD LOAD DEFLECTION DATA. "PRESTRESS CAMBER" & "RESIDUAL CAMBER", WHICH ARE TIME DEPENDENT VARIABLES, SHALL NOT BE SHOWN ON THE PLANS. DEAD LOAD DEFLECTION AT THE 1/4 POINTS SHALL BE SHOWN ON THE PLANS.

"INTERMEDIATE CONCRETE DIAPHRAGMS" SHALL BE USED ONLY WHEN THE USE OF STEEL DIAPHRAGMS IS NOT FEASIBLE BECAUSE OF UTILITIES OR FOR OTHER SPECIAL SITUATIONS. ONLY ONE TYPE OF INTERMEDIATE DIAPHRAGM SHALL BE SHOWN ON THE PLANS. THE USE OF BOTH INTERMEDIATE CONCRETE & STEEL DIAPHRAGMS ON THE SAME BRIDGE IS NOT ALLOWED.

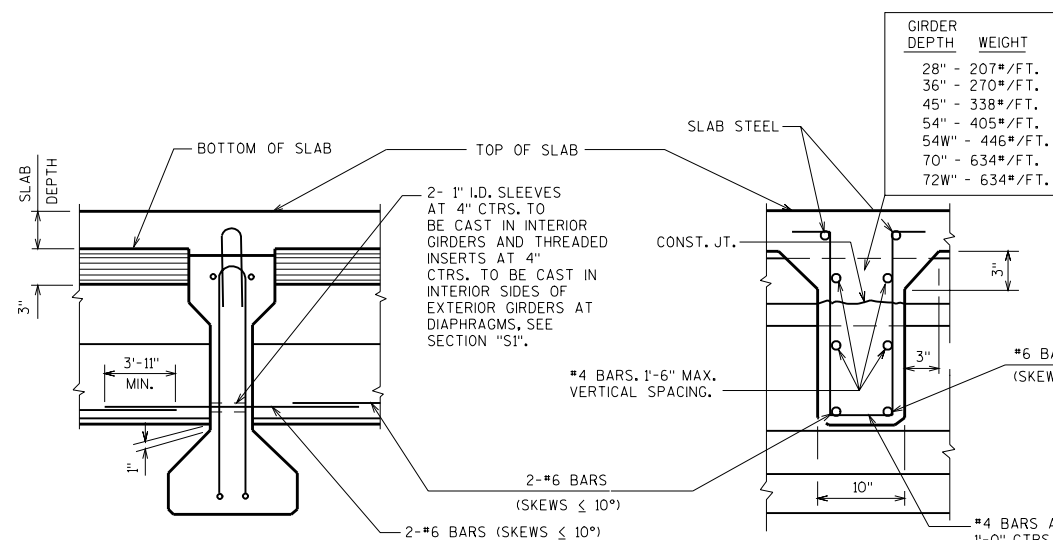
THE USE OF PILASTERS SHALL BE OPTIONAL.



SECTION AT EXTERIOR GIRDER



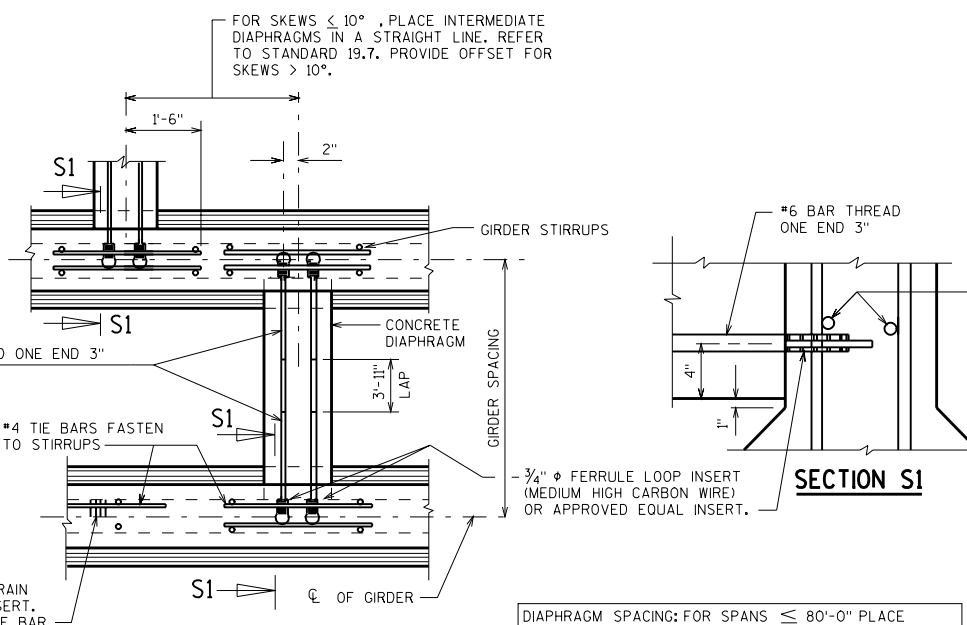
PILASTER DETAIL AT PIERS



ELEVATION OF DIAPHRAGM

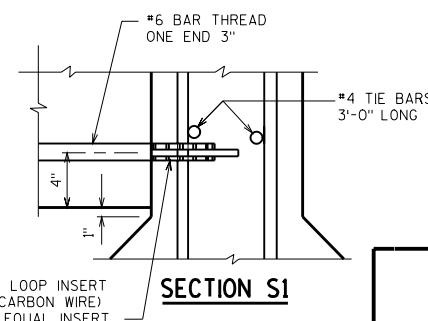
INTERMEDIATE CONCRETE DIAPHRAGM DETAILS

SECTION THRU DIAPHRAGM



TOP VIEW OF DIAPHRAGM

SKW ANGLES > 10°



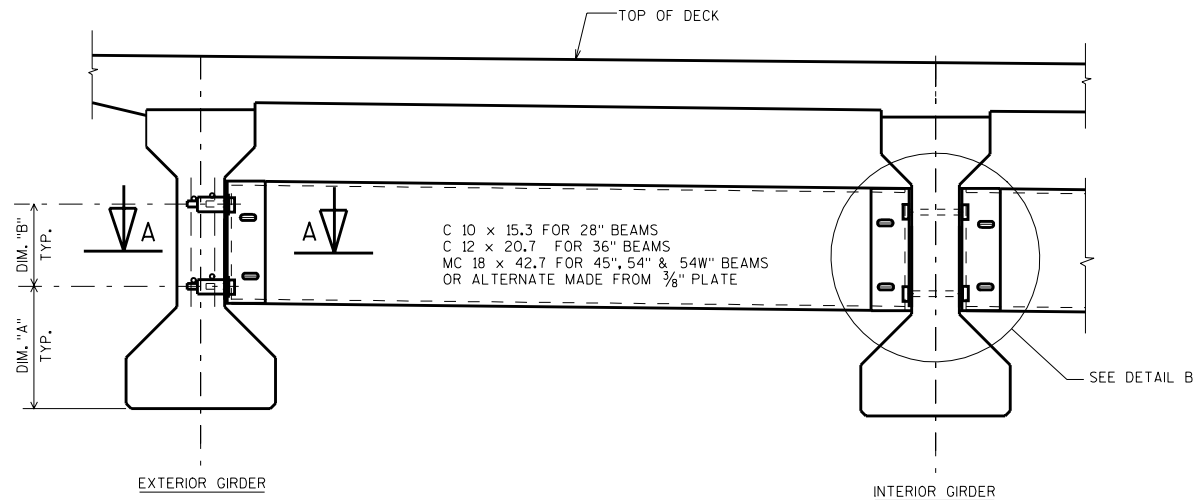
SECTION S1

DIAPHRAGM SPACING: FOR SPANS ≤ 80'-0" PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0" PLACE AT 1/3 AND 2/3 POINTS.

PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

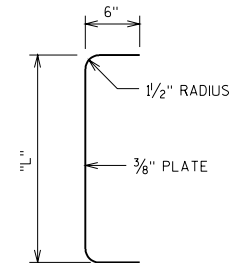
APPROVED: _____ DATE: 1/03



PART TRANSVERSE SECTION AT DIAPHRAGM

TABLE

GIRDER HEIGHT	DIM. "A"	DIM. "B"	DIM. "L"	* DIM. "X"
28"	1'-0 1/8"	5 7/8"	9 1/2"	2 1/4"
36"	1'-2 7/8"	9 7/8"	1'-1 1/2"	3 1/4"
45"	1'-5 5/8"	1'-1 7/8"	1'-5 1/2"	2 1/4"
54"	1'-7 7/8"	1'-5 7/8"	1'-9 1/2"	4 1/4"
54W"	1'-9 1/8"	1'-5 7/8"	1'-9 1/2"	4 1/4"



SECTION THRU ALTERNATE DIAPHRAGM

*DIM "X" = 2 1/2" FOR ALTERNATE PLATE DIAPHRAGM

NOTES

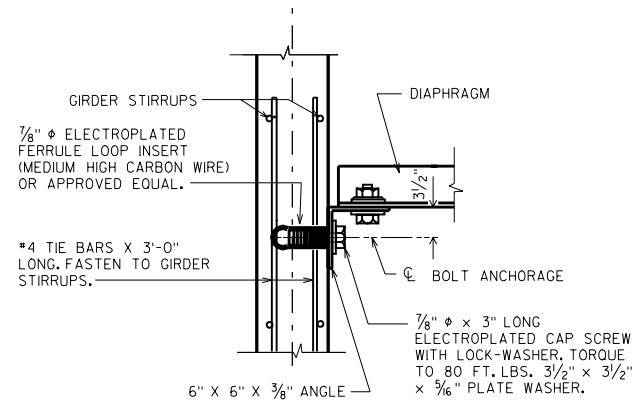
ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGM" STRUCTURE, EACH.

EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT.

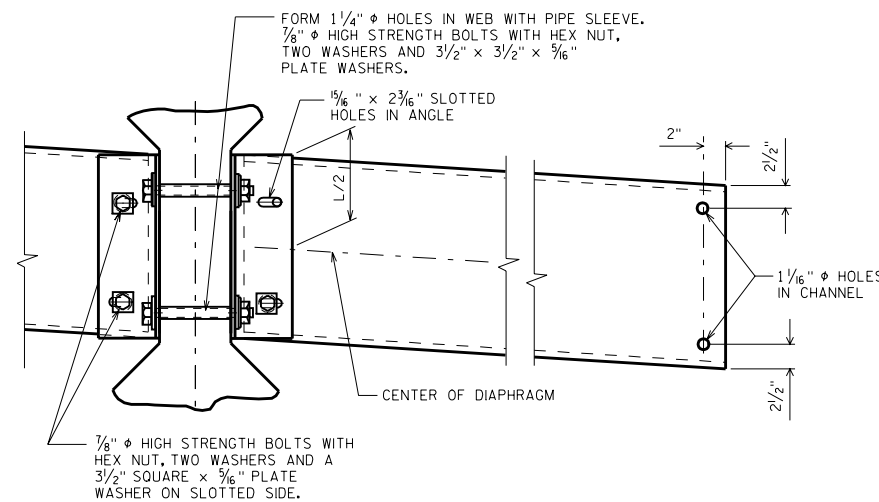
ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325 TYPE 1.

ALL DIAPHRAGM STRUCTURAL STEEL SHOWN SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.

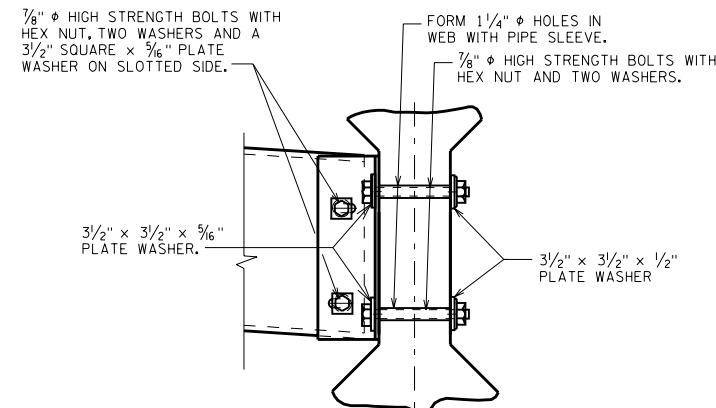
FOR SPANS EQUAL TO OR LESS THAN 80'-0", PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0", PLACE AT 1/3 AND 2/3 POINTS.



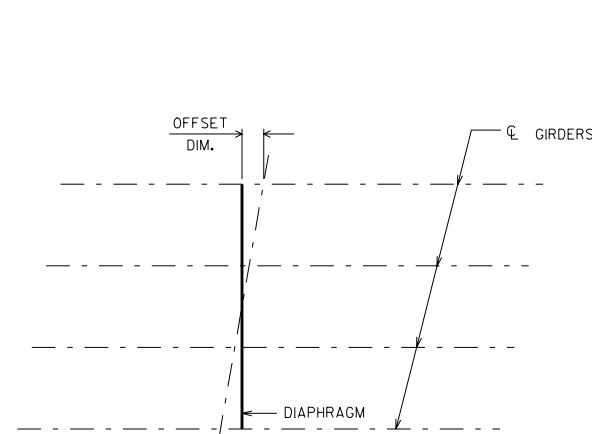
SECT. A-A
(FOR EXTERIOR ATTACHMENT)



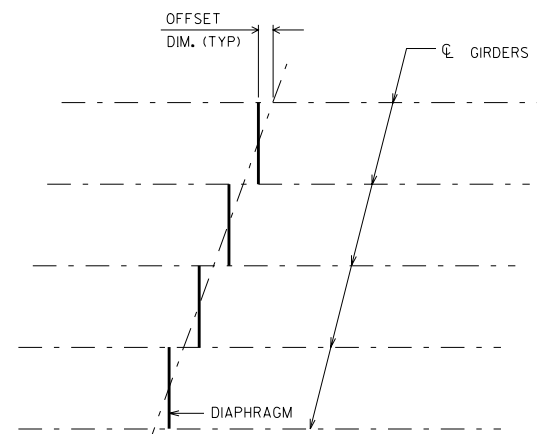
DETAIL B
(FOR CONTINUOUS LINE OF DIAPHRAGMS)



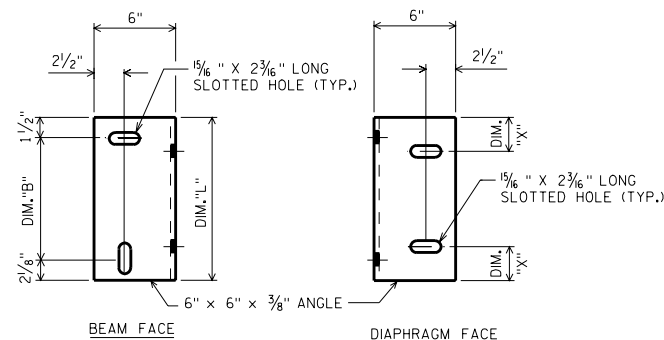
SECTION AT INTERIOR GIRDERS THRU DIAPHRAGM FOR SKEW ANGLES > 10°



PLAN FOR SKEW ANGLES ≤ 10°



PLAN FOR SKEW ANGLES > 10°



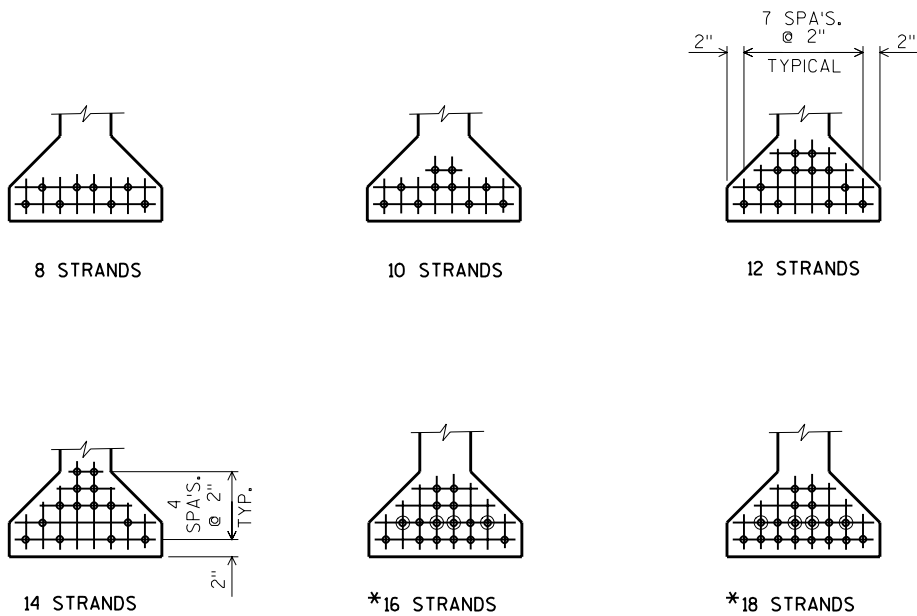
DIAPHRAGM SUPPORT

INTER. STEEL DIAPHS. FOR 28", 36", 45", 54", & 54W" PRESTRESSED GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

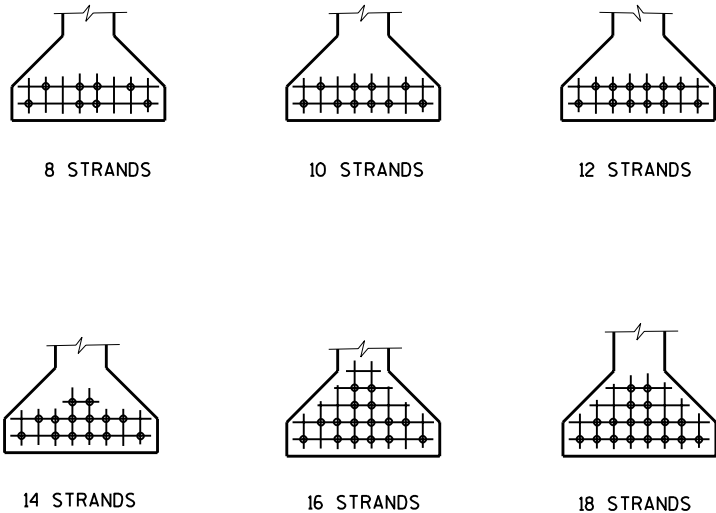
APPROVED: _____

DATE:
6/00



* NEEDS BOND BREAKERS AT ENDS. SEE BOND BREAKER DETAIL. ⊙ INDICATES STRAND TO BE DEBONDED

**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS**



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.5" & 0.6" STRANDS

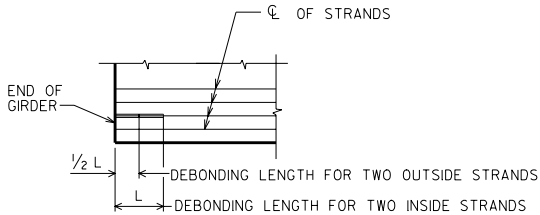
28" GIRDER

$A = 312 \text{ SQ. IN.}$
 $I = 28,687 \text{ IN.}^4$
 $r^2 = 91.95 \text{ IN.}^2$
 $y_T = 14.58 \text{ IN.}$
 $y_B = 13.42 \text{ IN.}$
 $S_T = 1,968 \text{ IN.}^3$
 $S_B = 2,138 \text{ IN.}^3$
 $WT. = 325 \text{ \#/FT.}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
 for low relaxation strands
 $P_i \text{ PER } 0.5" \phi \text{ STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$
 $P_i \text{ PER } 0.6" \phi \text{ STRAND} = 0.217 \times 202,500 = \underline{43.94 \text{ KIPS}}$
 $\frac{y_B}{r^2} = \frac{13.42}{91.95} = 0.1459 \text{ IN./IN.}^2$

(COMPRESSION IS NEGATIVE)							
N NO. STRANDS	(1) e_s (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$	(3) $(A/(2))$ (sq. in.)	(4) $P(\text{init.}) = A_s f_s$ 0.5" ϕ STRANDS (KIPS)	(4) $P(\text{init.}) = A_s f_s$ 0.6" ϕ STRANDS (KIPS)	(5) $f_B(\text{init.}) = \frac{(4)}{(3)}$ 0.5" ϕ STRANDS (K/sq.in.)	(5) $f_B(\text{init.}) = \frac{(4)}{(3)}$ 0.6" ϕ STRANDS (K/sq.in.)
STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS							
8	10.40	2.52	123.8	248	352	-2.003	-2.843
10	9.80	2.43	128.4	310	439	-2.414	-3.419
12	8.73	2.27	137.4	372	527	-2.707	-3.836
14	7.97	2.16	144.4	434	615	-3.006	-4.259
*16	9.4	2.37	131.6	496	703	-3.769	-5.342
*18	9.6	2.40	130.0	558	791	-4.292	-6.085
STANDARD STRAND PATTERNS FOR DRAPED STRANDS							
8	10.4	2.52	123.8	248	352	-2.003	-2.843
10	10.6	2.55	122.4	310	439	-2.532	-3.587
12	10.4	2.52	123.8	372	527	-3.005	-4.257
14	10.0	2.46	126.8	434	615	-3.423	-4.850
16	9.4	2.37	131.6	496	703	-3.769	-5.342
18	9.6	2.40	130.0	558	791	-4.292	-6.085



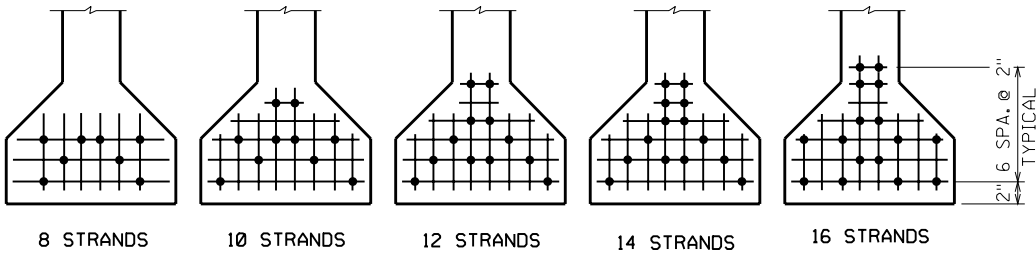
BOND BREAKER DETAIL

SHOWING LENGTHS OF DEBONDING FROM END OF GIRDER. DEBOND LENGTHS TO BE DESIGNED. STRAND DEVELOPMENT LENGTH IS 2'-6"

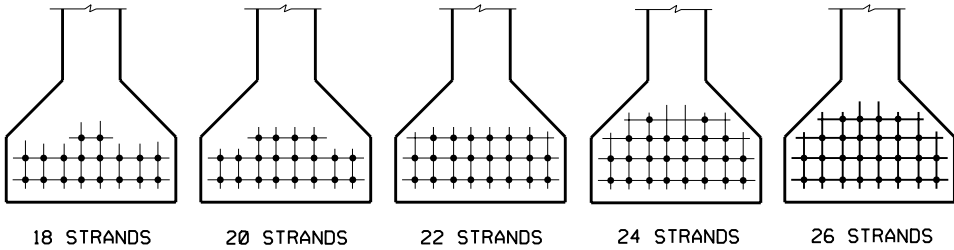
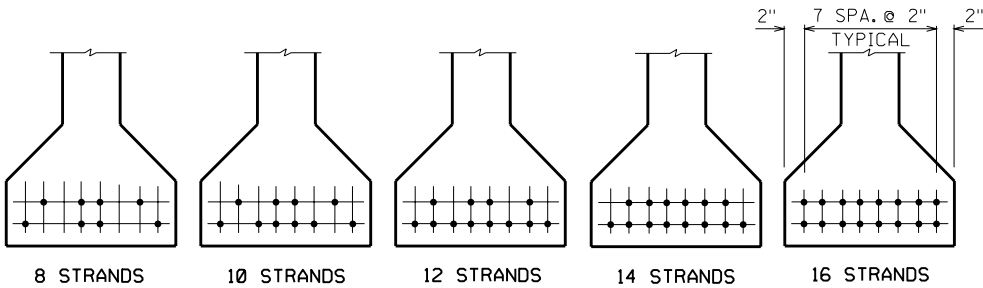
**28" PRETENSIONED GIRDER
DESIGN DATA**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

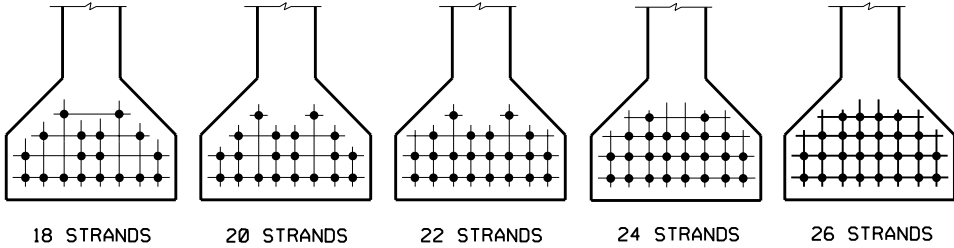
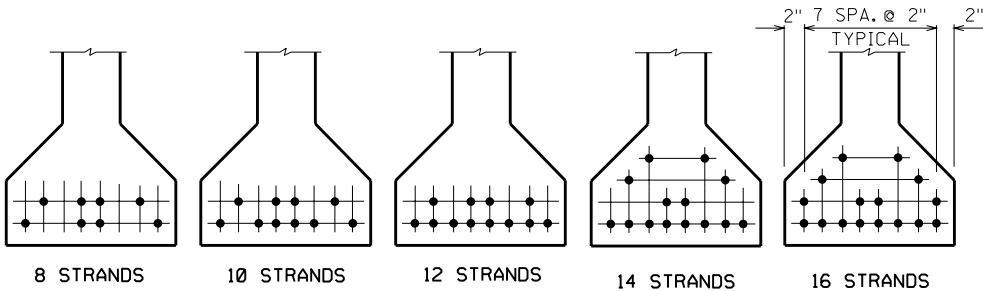
APPROVED: _____ DATE: 11/99



STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.5" ϕ STRANDS



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.6" ϕ STRANDS

36" GIRDER

$A = 369 \text{ SQ. IN.}$

$r^2 = 138.15 \text{ IN.}^2$

$y_T = 20.17 \text{ IN.}$

$y_B = 15.83 \text{ IN.}$

$I = 50,979 \text{ IN.}^4$

$S_T = 2,527 \text{ IN.}^3$

$S_B = 3,220 \text{ IN.}^3$

$WT. = 384 \text{ \#/FT.}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$

$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
for low relaxation strands

Pi PER 0.5" ϕ STRAND = $0.1531 \times 202,500 = 31.00 \text{ KIPS}$

Pi PER 0.6" ϕ STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$\frac{y_B}{r^2} = \frac{15.83}{138.15} = 0.1146 \text{ IN./IN.}^2$

(COMPRESSION IS NEGATIVE)

N NO. STRANDS	(1) e_s 0.5" ϕ STRANDS (inches)	(1) e_s 0.6" ϕ STRANDS (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$ 0.5" ϕ STRANDS	(2) $(1 + \frac{e_s y_B}{r^2})$ 0.6" ϕ STRANDS	(3) (A/(2)) 0.5" ϕ STRANDS (sq. in.)	(3) (A/(2)) 0.6" ϕ STRANDS (sq. in.)	(4) $P(\text{Init.}) = A_s f_s$ 0.5" ϕ STRANDS (KIPS)	(4) $P(\text{Init.}) = A_s f_s$ 0.6" ϕ STRANDS (KIPS)	(5) $f_B(\text{Init.}) = (4)/(3)$ 0.5" ϕ STRANDS (K/Sq. In.)	(5) $f_B(\text{Init.}) = (4)/(3)$ 0.6" ϕ STRANDS (K/Sq. In.)
STANDARD PATTERNS FOR UNDRAPED STRANDS										
8	11.33	11.33	2.298	2.298	160.56	160.56	248	352	-1.544	-2.192
10	10.23	10.23	2.172	2.172	169.87	169.87	310	439	-1.825	-2.584
12	9.83	9.83	2.126	2.126	173.53	173.53	372	527	-2.143	-3.037
14	9.26	9.26	2.061	2.061	179.04	179.04	434	615	-2.424	-3.435
16	9.08	9.08	2.040	2.040	180.84	180.84	496	703	-2.742	-3.887
STANDARD PATTERNS FOR DRAPED STRANDS										
8	12.83	12.83	2.470	2.470	149.38	149.38	248	352	-1.660	-2.356
10	13.03	13.03	2.493	2.493	148.01	148.01	310	439	-2.094	-2.966
12	13.16	13.16	2.508	2.508	147.14	147.14	372	527	-2.528	-3.582
14	12.97	12.12	2.486	2.389	148.42	154.46	434	615	-2.924	-3.982
16	12.83	12.08	2.470	2.384	149.39	154.78	496	703	-3.320	-4.542
18	12.50	11.83	2.432	2.356	151.71	156.62	558	791	-3.678	-5.050
20	12.23	11.83	2.401	2.356	153.66	156.62	620	879	-4.035	-5.612
22	12.01	11.83	2.376	2.356	155.30	156.62	682	967	-4.392	-6.174
24	11.66	11.66	2.336	2.336	157.96	157.96	744	1055	-4.710	-6.679
26	11.37	11.37	2.303	2.303	160.24	160.24	806	1142	-5.030	-7.127

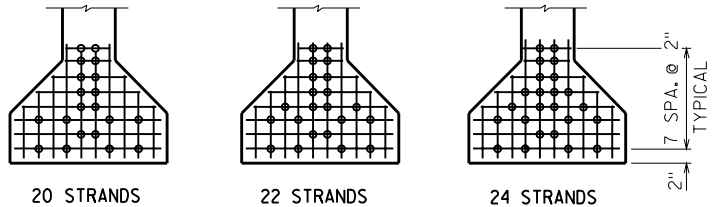
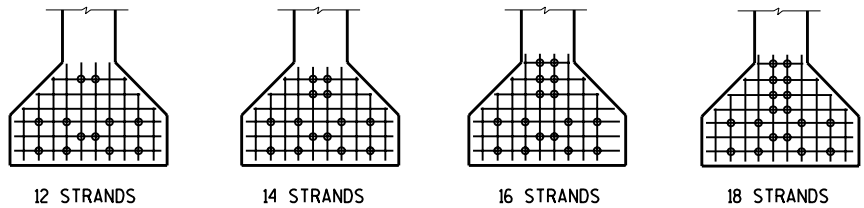
36" PRETENSIONED GIRDER
DESIGN DATA

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

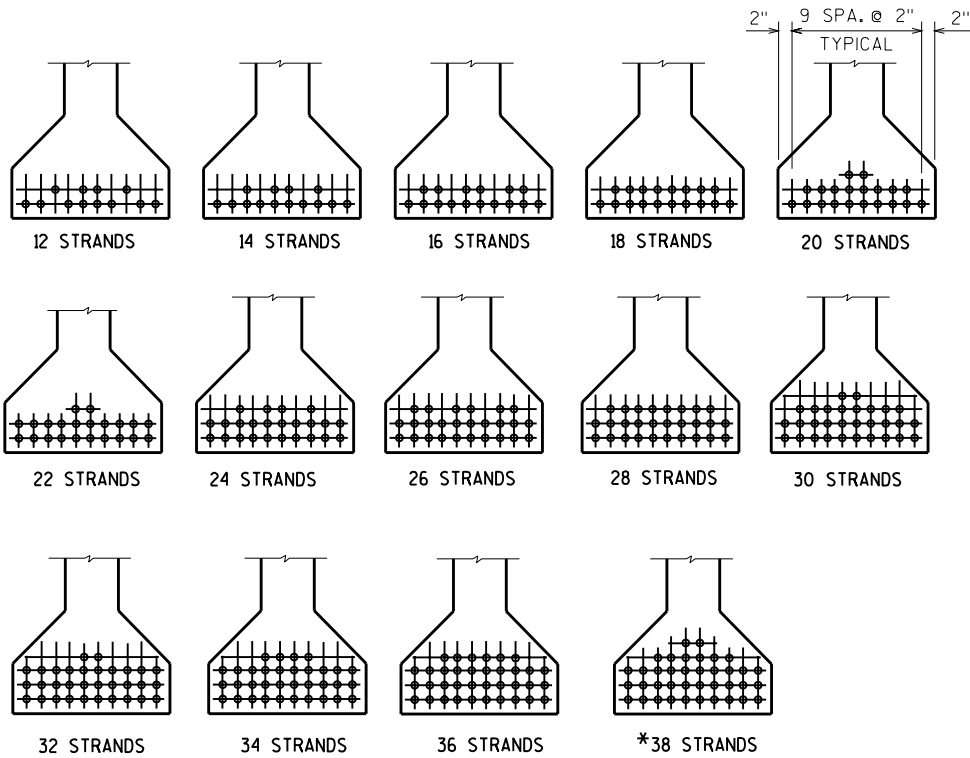
APPROVED: _____

DATE:

11/99



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS**



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED 0.5" & 0.6" STRANDS

*1/2" ϕ STRANDS ONLY

45" GIRDER

$A = 560 \text{ SQ. IN.}$
 $r^2 = 223.91 \text{ IN.}^2$
 $y_T = 24.73 \text{ IN.}$
 $y_B = 20.27 \text{ IN.}$
 $I = 125,390 \text{ IN.}^4$
 $S_T = 5,070 \text{ IN.}^3$
 $S_B = 6,186 \text{ IN.}^3$
 $WT. = 583 \text{ \#/FT.}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
 for low relaxation strands.
 $P_i \text{ PER } 0.5" \phi \text{ STRAND} = 0.1531 \times 202,500 = 31.00 \text{ KIPS}$
 $P_i \text{ PER } 0.6" \phi \text{ STRAND} = 0.217 \times 202,500 = 43.94 \text{ KIPS}$
 $\frac{y_B}{r^2} = \frac{20.27}{223.91} = 0.09053 \text{ IN./IN.}^2$

(COMPRESSION IS NEGATIVE)

N NO. STRANDS	(1) e_s (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$	(3) (A/(2)) (sq. in.)	(4) $P(\text{ini t.}) = A_s f_s$ 0.5" ϕ STRANDS (KIPS)	(4) $P(\text{ini t.}) = A_s f_s$ 0.6" ϕ STRANDS (KIPS)	(5) $f_B (\text{ini t.}) = (4)/(3)$ 0.5" ϕ STRANDS (K/Sq. In.)	(5) $f_B (\text{ini t.}) = (4)/(3)$ 0.6" ϕ STRANDS (K/Sq. In.)
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STANDARD PATTERNS FOR UNDRAPED STRANDS

12	14.94	2.352	238.10	372	527	-1.562	-2.213
14	14.27	2.292	244.33	434	615	-1.776	-2.517
16	13.27	2.201	254.43	496	703	-1.949	-2.763
18	13.15	2.190	255.71	558	791	-2.182	-3.093
20	12.27	2.111	265.28	620	879	-2.337	-3.313
22	12.27	2.111	265.28	682	967	-2.571	-3.645
24	12.10	2.095	267.30	744	1055	-2.783	-3.947

STANDARD PATTERNS FOR DRAPED STRANDS

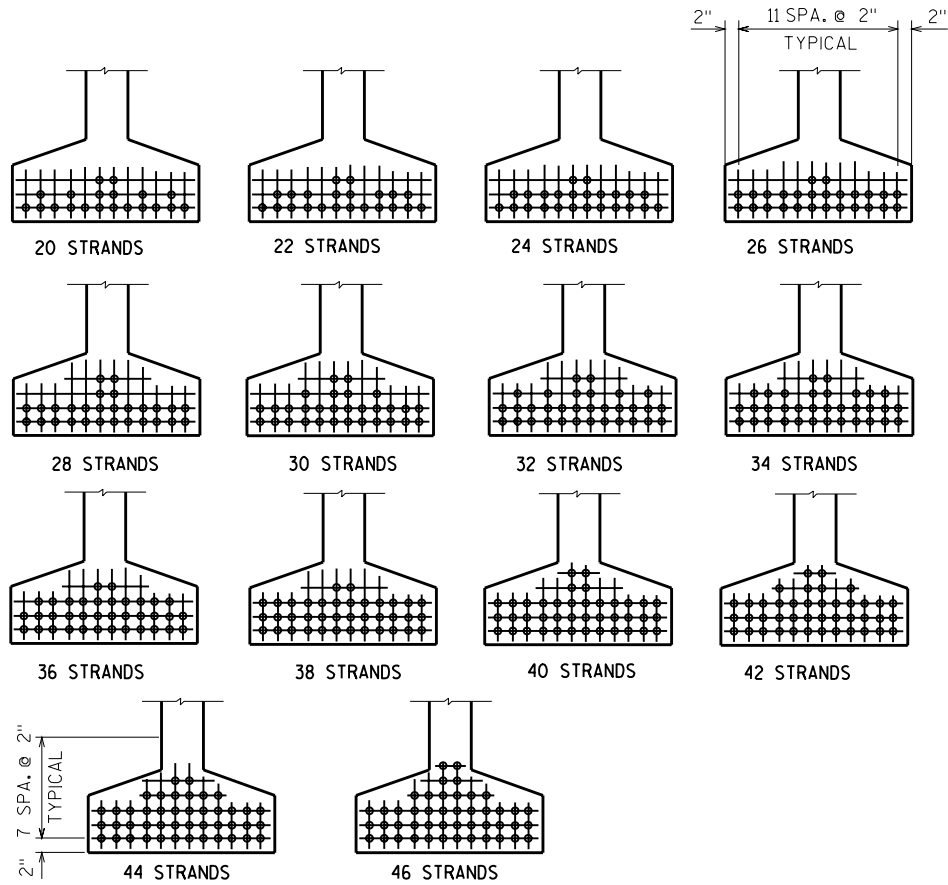
12	17.60	2.593	215.97	372	527	-1.722	-2.440
14	17.70	2.602	215.22	434	615	-2.017	-2.858
16	17.52	2.586	216.55	496	703	-2.290	-3.246
18	17.38	2.573	217.64	558	791	-2.564	-3.634
20	17.07	2.545	220.04	620	879	-2.818	-3.995
22	17.01	2.540	220.47	682	967	-3.093	-4.386
24	16.77	2.518	222.40	744	1055	-3.345	-4.744
26	16.58	2.501	223.91	806	1143	-3.600	-5.105
28	16.41	2.486	225.26	868	1230	-3.853	-5.460
30	16.13	2.460	227.64	930	1318	-4.085	-5.790
32	16.02	2.450	228.57	992	1406	-4.340	-6.151
34	15.80	2.430	230.45	1054	1494	-4.574	-6.483
36	15.60	2.412	232.17	1116	1582	-4.807	-6.814
38	15.32	2.387	234.60	1178		-5.021	

**45" PRETENSIONED GIRDER
DESIGN DATA**

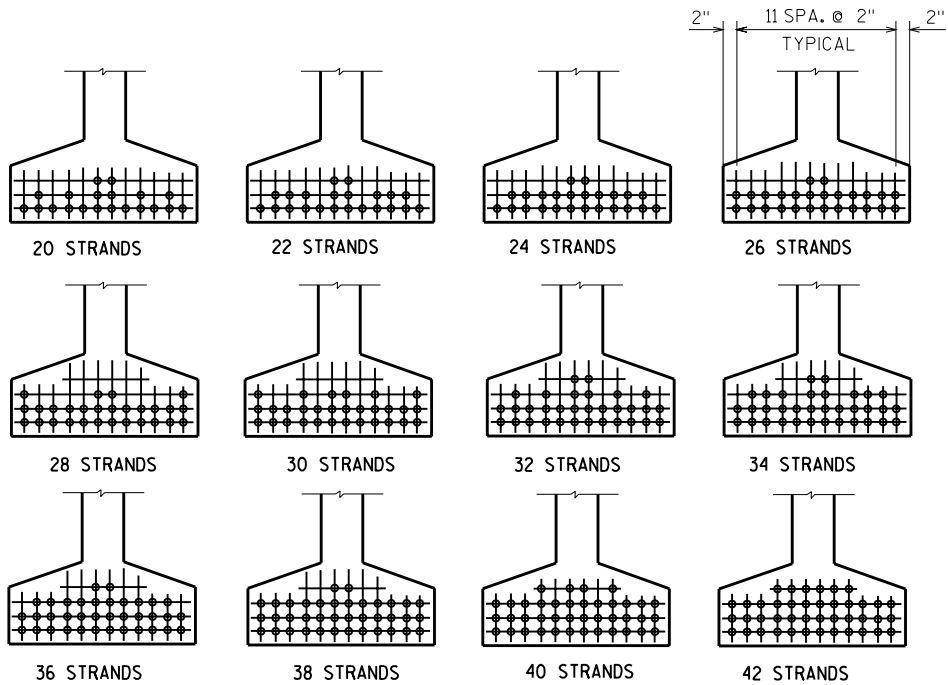
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
11/99



ARRANGEMENT AT ¼ SPAN FOR GIRDERS WITH DRAPED 0.5" ØSTRANDS



ARRANGEMENT AT ¼ SPAN FOR GIRDERS WITH DRAPED 0.6" ØSTRANDS

70" GIRDER

A = 774 SQ. IN.

I = 510,613 IN.⁴

r² = 659.70 IN.²

y_T = 35.38 IN.

y_B = 34.62 IN.

S_T = 14,430 IN.³

S_B = 14,750 IN.³

WT. = 0.806 KIPS/FT. + 6.6 KIPS FOR BOTH END BLOCKS

PRE-TENSION

f_s' = 270,000 P.S.I.

f_s = 0.75 X 270,000 = 202,500 P.S.I.
for low relaxation strands

Pi PER ½" Ø STRAND = 0.1531 X 202,500 = 31.00 KIPS

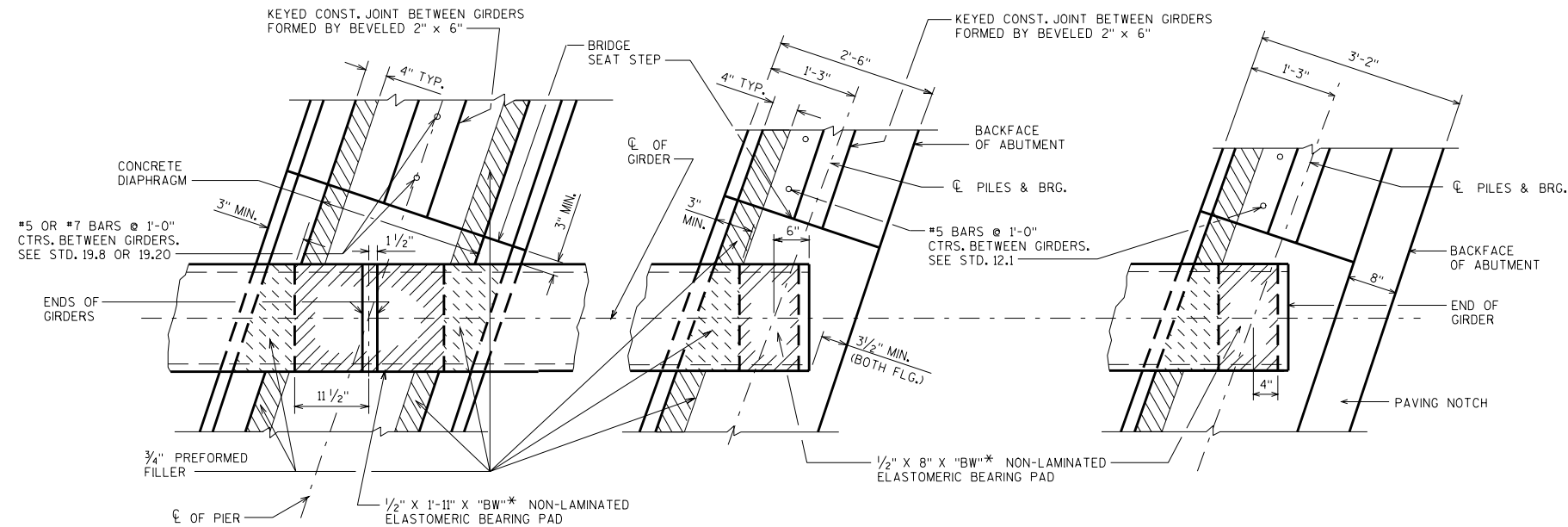
Pi PER 0.6" Ø STRAND = 0.217 X 202,500 = 43.94 KIPS

$\frac{y_B}{r^2} = \frac{34.62}{659.70} = 0.05248 \text{ IN./IN.}^2$

(COMPRESSION IS NEGATIVE)

N	(1) e _s 0.5" Ø STRANDS (inches)	(1) e _s 0.6" Ø STRANDS (inches)	(2) e _s y _B (1 + $\frac{e_s y_B}{r^2}$) 0.5" Ø STRANDS	(2) e _s y _B (1 + $\frac{e_s y_B}{r^2}$) 0.6" Ø STRANDS	(3) (A/(2)) 0.5" Ø STRANDS (sq. in.)	(3) (A/(2)) 0.6" Ø STRANDS (sq. in.)	(4) P(Init.) = A _s f _s 0.5" Ø STRANDS (KIPS)	(4) P(Init.) = A _s f _s 0.6" Ø STRANDS (KIPS)	(5) f _B (Init.)=(4)/(3) 0.5" Ø STRANDS (K/Sq. In.)	(5) f _B (Init.)=(4)/(3) 0.6" Ø STRANDS (K/Sq. In.)
STANDARD PATTERNS FOR DRAPED STRANDS										
20	31.62	31.62	2.659	2.659	291.087	291.087	620	879	-2.130	-3.020
22	31.53	31.53	2.655	2.655	291.525	291.525	682	967	-2.339	-3.317
24	31.45	31.45	2.650	2.650	292.075	292.075	744	1055	-2.548	-3.613
26	31.39	31.39	2.647	2.647	292.406	292.406	806	1142	-2.757	-3.906
28	31.05	31.19	2.629	2.637	294.409	293.515	868	1230	-2.957	-4.178
30	30.89	31.02	2.621	2.628	295.307	294.521	930	1318	-3.158	-4.463
32	30.74	30.74	2.613	2.613	296.211	296.211	992	1406	-3.350	-4.747
34	30.62	30.62	2.607	2.607	296.893	296.893	1054	1494	-3.550	-5.032
36	30.51	30.51	2.601	2.601	297.578	297.578	1116	1582	-3.750	-5.316
38	30.41	30.41	2.596	2.596	298.151	298.151	1178	1670	-3.951	-5.601
40	30.12	30.22	2.581	2.586	299.884	299.304	1240	1758	-4.143	-5.862
42	29.95	30.05	2.572	2.577	300.933	300.349	1302	1845	-4.335	-6.131
44	29.80	29.80	2.564	2.564	301.872	301.872	1364	—	-4.518	—
46	29.49	29.49	2.547	2.547	303.887	303.887	1426	—	-4.693	—

70" PRETENSIONED GIRDER DESIGN DATA	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 3/00



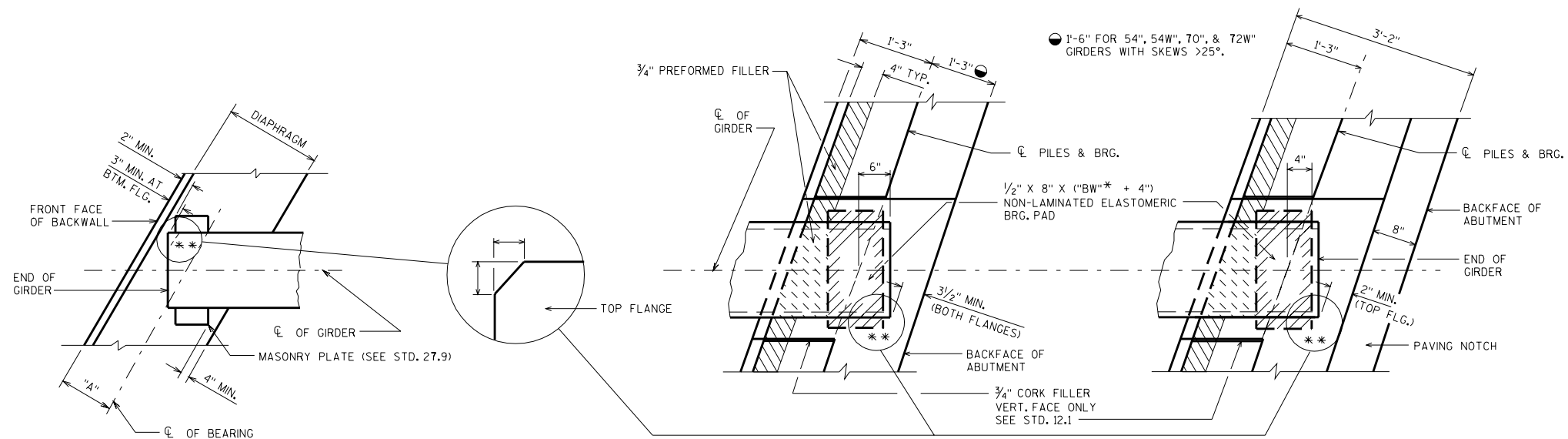
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AT ABUTMENT

ABUTMENT: TYPE "A1 FIXED" AND "A5" W/O PAVING NOTCH

AT ABUTMENT

ABUTMENT: TYPE "A1 FIXED" AND "A5" WITH PAVING NOTCH.



PLAN AT ABUTMENT

ABUTMENT: TYPE "A3" OR "A4" SEE TABLE FOR MIN. "A" VALUES REQ'D. TO MEET MIN. CLEARANCE CRITERIA ABOVE.

** FORM-OUT CORNER OF TOP FLANGE ON 54W", 70", & 72W" PRESTRESSED GIRDERS TO MEET MIN. CLEARANCE REQ'D.

AT ABUTMENT

ABUTMENT: TYPE "A1 SEMI-EXP." W/O PAVING NOTCH

AT ABUTMENT

ABUTMENT: TYPE "A1 SEMI-EXP." WITH PAVING NOTCH.

MIN. 'A' DIMENSION IN INCHES FOR A3 AND A4 ABUTMENTS WITH STEEL BEARINGS AS SHOWN ON STD. 27.9.							
SKEW ANGLE °	GIRDER DEPTHS						
	28"	36"	45"	54"	54W"	70"	72W"
0-5	12"	12"	12"	12"	12"	12"	12"
> 5-15	12"	12"	12"	12.5"	13"	13"	13"
> 15-25	12.5"	12.5"	13"	14"	15"	15"	15"
> 25-35	(14")	(14")	(15")	(16.5")	(17.5")	16.5"	(17.5")
> 35-45	(15.5")	(15.5")	(17")	(18.5")	(20")	(18.5")	(20")
> 45-55	(17")	(17")	(18.5")	(20")	(21.5")	(20")	(21.5")

VALUES IN PARENTHESIS ARE CONTROLLED BY 2" CLR. CRITERIA AT EDGE OF MASONRY PLATE. VALUES MAY BE ADJUSTED IF MASONRY PLATE IS CLIPPED PER STANDARD 27.2.

PRESTRESSED GIRDER FLANGE WIDTH TABLE							
GIRDER DEPTH	28"	36"	45"	54"	54W"	70"	72W"
TOP FLANGE WIDTH	18"	12"	16"	20"	48"	30"	48"
BOTTOM FLANGE WIDTH "BW" *	18"	18"	22"	26"	30"	26"	30"

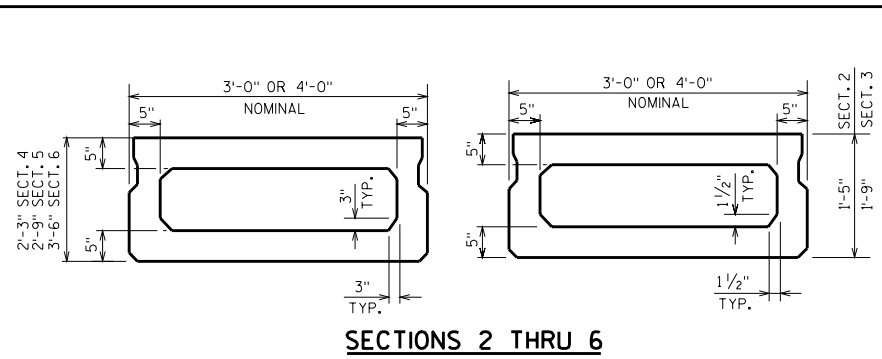
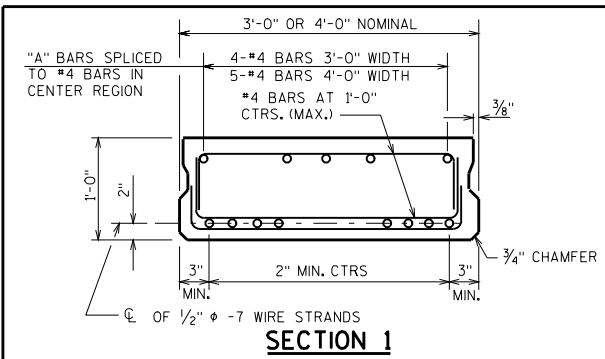
BEARING PAD DETAILS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:

1/03



SECTION 1

SECTIONS 2 THRU 6

SHEAR KEY
OMIT SHEAR KEY ON EXTERIOR FACE OF EXTERIOR GIRDERS.

(SEE "CROSS SECTION" VIEW)

SECT. NO.	DEPTH	"A"	"B"
1	1'-0"	7 1/2"	7 1/2"
2	1'-5"	9"	1'-0"
3	1'-9"	1'-0"	1'-4"
4	2'-3"	1'-3"	1'-10"
5	2'-9"	1'-3"	2'-4"
6	3'-6"	1'-3"	3'-1"

SEE CHAPTER 19 OF THIS MANUAL FOR POLICY ON SELECTING 3'-0" SECTIONS OR 4'-0" SECTIONS.

NOTES

FOUR WAY SLING MUST BE USED TO ENGAGE ALL 4 LIFTING DEVICES ON BOTH ENDS OF UNITS.

STRANDS SHALL BE FLUSH WITH END OF UNIT.

VOIDS SHALL BE VENTED AND DRAINED BY CASTING A 1" ϕ TUBE AT EACH END AND CENTER OF VOID SEGMENT.

SLOPE BEAM SEATS TO MATCH ROADWAY CROWN.

SLOPE BEAM SEATS PARALLEL TO GRADE LINE IF GRADE AT BRG. > 1%. PLACE ELEVATIONS ON PLANS TO MEET THESE REQUIREMENTS.

POST-TENSIONING OF THE TRANSVERSE TENDONS SHALL NOT BEGIN UNTIL THE GROUT BETWEEN THE PRECAST BEAMS HAS BEEN ALLOWED TO CURE FOR 48 HOURS.

BAR STEEL REINFORCEMENT SHALL BE GRADE 60. (FY=60 K.S.I.).

PRESTRESSING STEEL ULTIMATE STRENGTH = 270 K.S.I..

PRESTRESSED CONCRETE STRENGTH AT 28 DAYS = 5.0 K.S.I..

THE CEMENT AND FINE AGGREGATE FOR THE GROUT BETWEEN THE POST-TENSIONED BEAMS SHALL BE PROPORTIONED BY WEIGHT AS INDICATED IN THE FOLLOWING TABLE. THE CEMENT USED SHALL BE TYPE I. WATER SHALL BE ADDED IN AMOUNTS AS NECESSARY TO OBTAIN APPROXIMATELY A 5" SLUMP OR TO A CONSISTENCY TO INSURE THAT THE VOIDS ARE COMPLETELY FILLED. THE GROUT SHALL BE RODDED TO INSURE THAT THE VOIDS ARE COMPLETELY FILLED.

CEMENT PER CU. YD.	FINE AGGREGATE PER CU. YD.
920 LBS.	2350 LBS. SSD AT 2.65 SPECIFIC GRAVITY

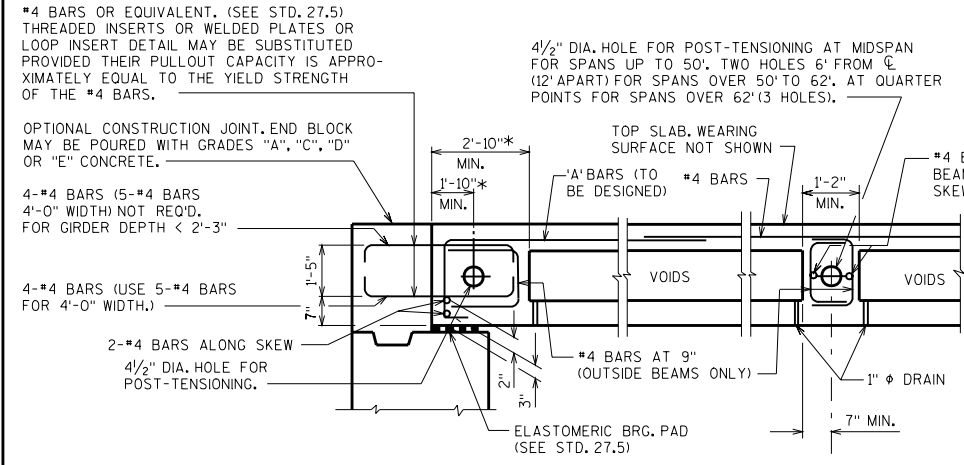
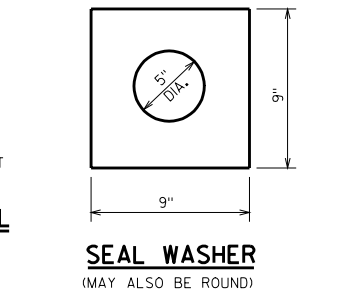
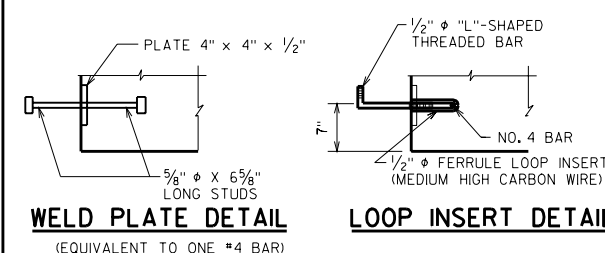
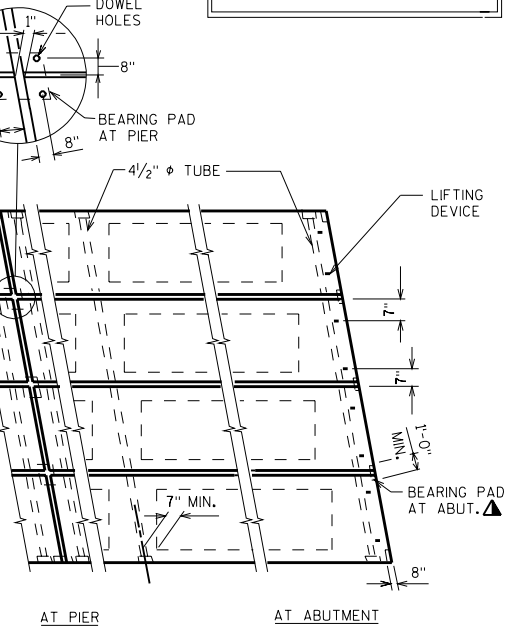
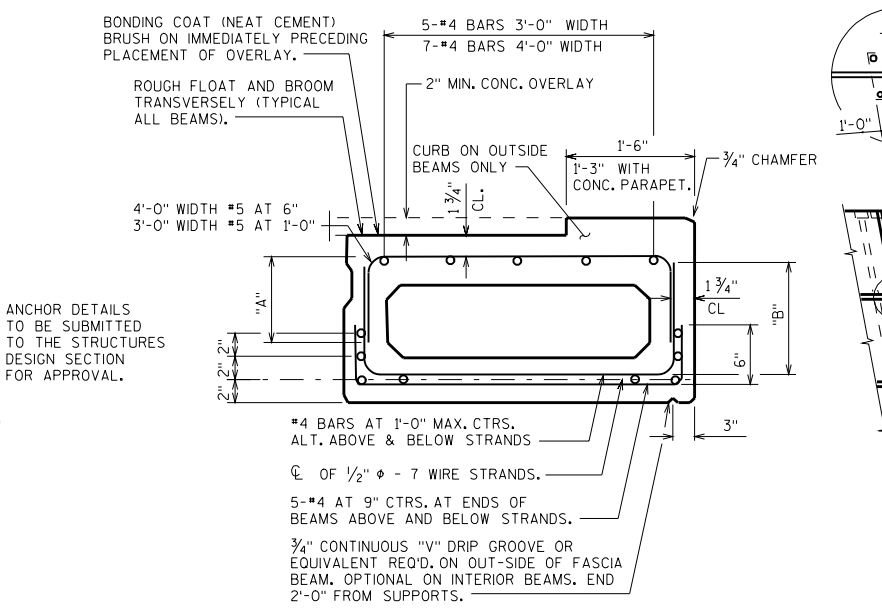
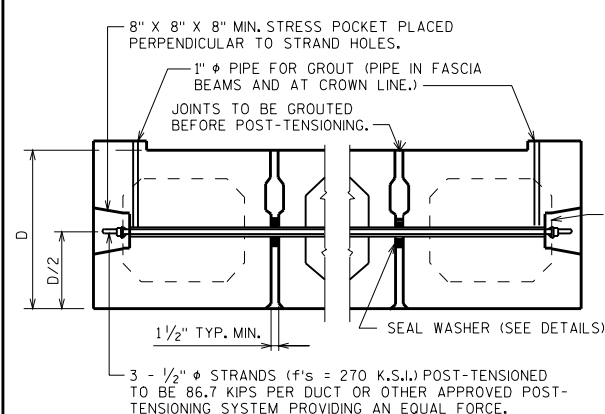
THE MAXIMUM ALLOWABLE SKEW ANGLE OF THE STRUCTURE SHALL BE 45°.

ABUTMENT BACKWALLS AND CONCRETE OVERLAY SHALL NOT BE POURED UNTIL AFTER THE POST-TENSIONING HAS BEEN COMPLETED.

SEAL WASHER SHALL BE SPONGE NEOPRENE GASKET 2 1/2" MIN. THICK. STRESS POCKETS SHALL BE FILLED WITH CHLORIDE FREE NON-SHRINK GROUT AFTER POST-TENSIONING (REFER TO SPECIAL PROVISION FOR NON-SHRINK GROUT SPECIFICATIONS.)

TRANSITION BETWEEN CHANGING SLOPES OF POST-TENSIONING DUCTS SHALL BE PROVIDED BY EITHER A CIRCULAR OR PARABOLIC CURVE WITH A MINIMUM LENGTH OF 3'-0".

POST-TENSIONING DUCTS SHALL BE PRESSURE GROUTED FROM ONE GROUT PIPE UNTIL ALL ENTRAPPED AIR IS EXPELLED AND GROUT BEGINS TO FLOW FROM THE OPEN GROUT PIPE. THE OPEN GROUT PIPE SHALL BE CLOSED AND A PRESSURE OF 50 PSI MAINTAINED FOR 15 SECONDS. THE GROUT COMPOSITION SHALL BE 94 LBS. OF TYPE I CEMENT, 5 GALLONS OF WATER AND 1 LB. OF APPROVED PLASTICIZER OR A PRE-MIXED PACKAGED GROUT APPROVED BY THE STRUCTURES DESIGN SECTION.

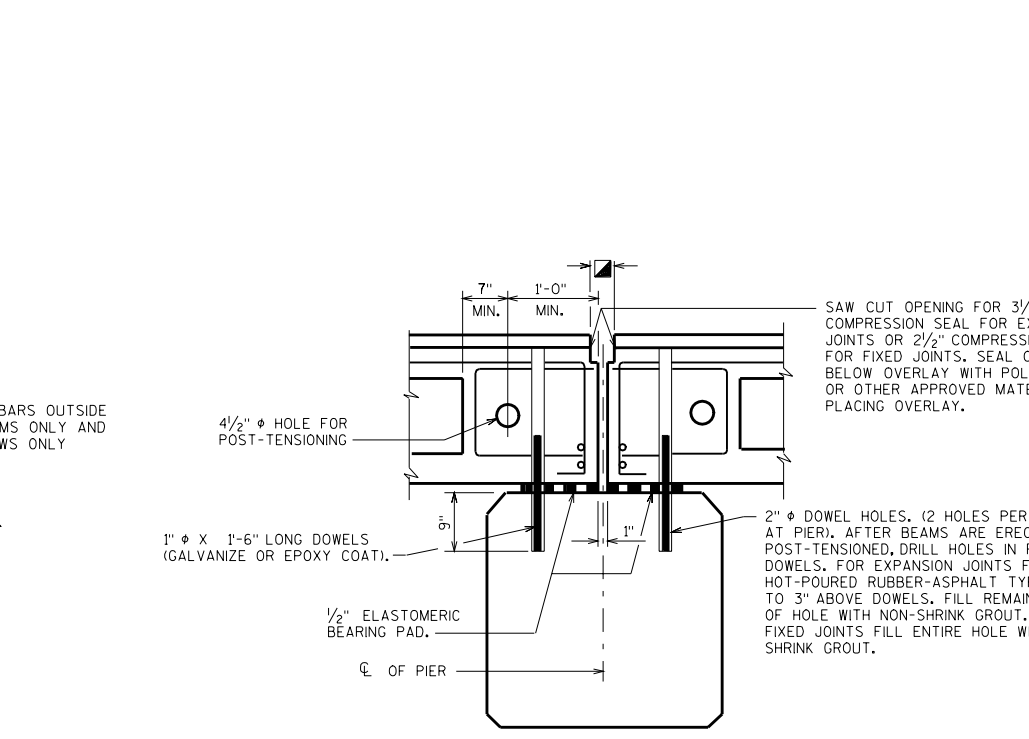


CROSS SECTION

TYPICAL PLAN

LEGEND

- * WHEN WINGS ARE PARALLEL TO ABUTMENT ϕ , CHOOSE THESE DIMENSIONS TO ALLOW FOR EASE OF POST-TENSIONING OPERATION.
- MINIMUM INSTALLATION WIDTH PLUS 1/4".
- ▲ PLACE 3/4" FILLER BETWEEN BEARING PADS.



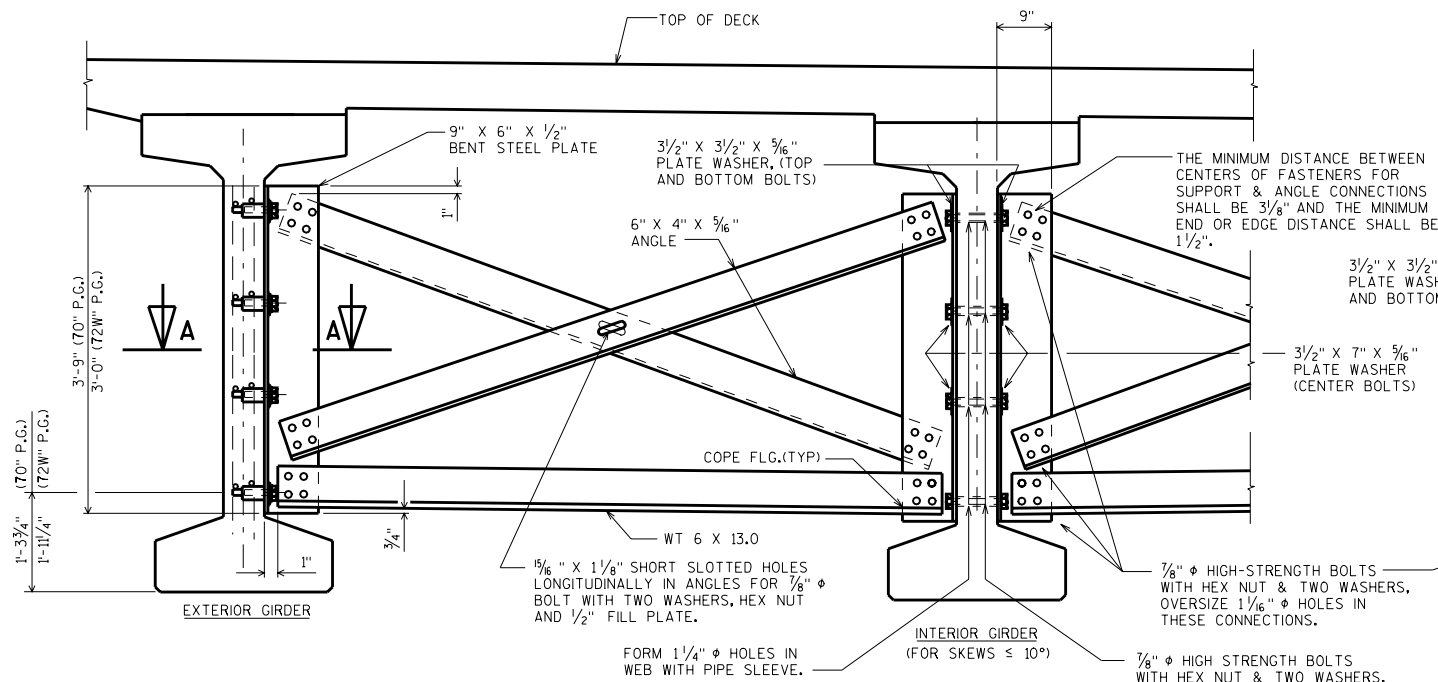
TYPICAL LONGITUDINAL SECTION

LONGITUDINAL SECTION AT PIER

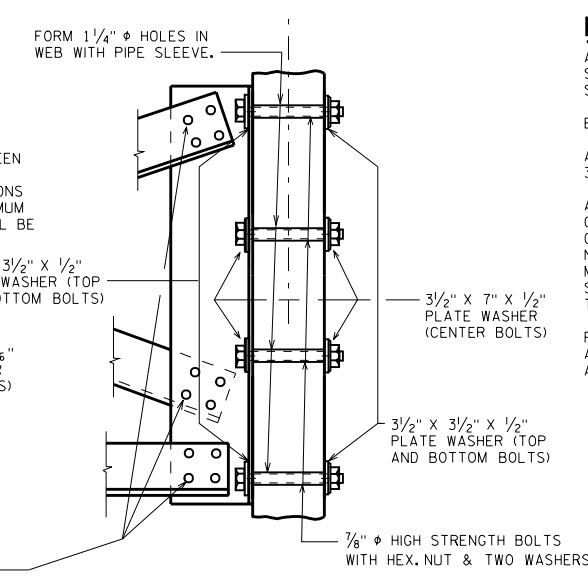
PRETENSIONED SLAB & BOX SECTIONS POST-TENSIONED TRANSVERSELY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-02



PART TRANSVERSE SECTION AT DIAPHRAGM



SECTION AT INTERIOR GIRDERS THRU DIAPHRAGM FOR SKEW ANGLES > 10°

NOTES

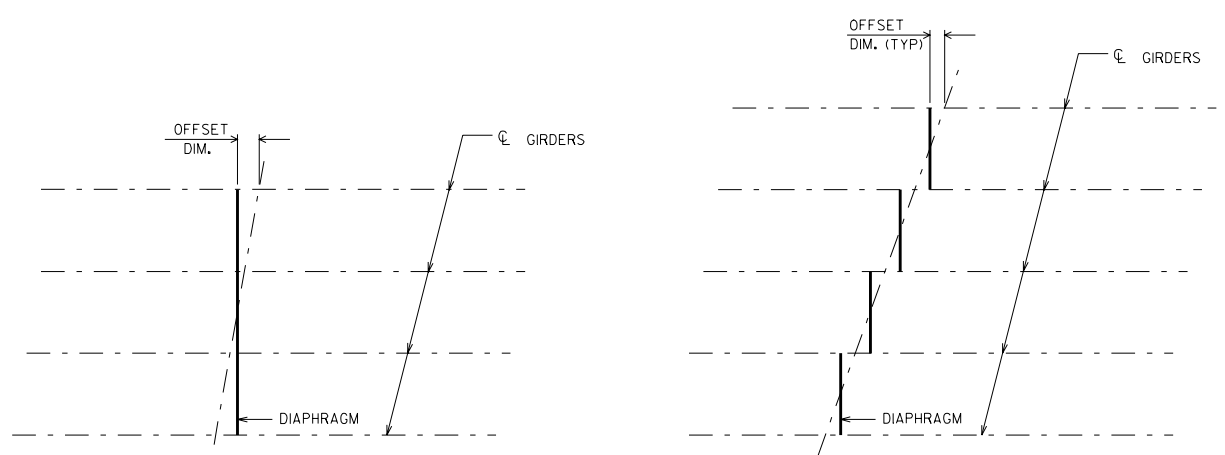
ALL DIAPHRAGM MATERIAL NOT EMBEDDED IN THE CONCRETE GIRDER SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STEEL DIAPHRAGM," STRUCTURE, EACH.

EACH DIAPHRAGM BETWEEN GIRDERS SHALL CONSTITUTE ONE UNIT.

ALL DIAPHRAGM STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325 TYPE 1.

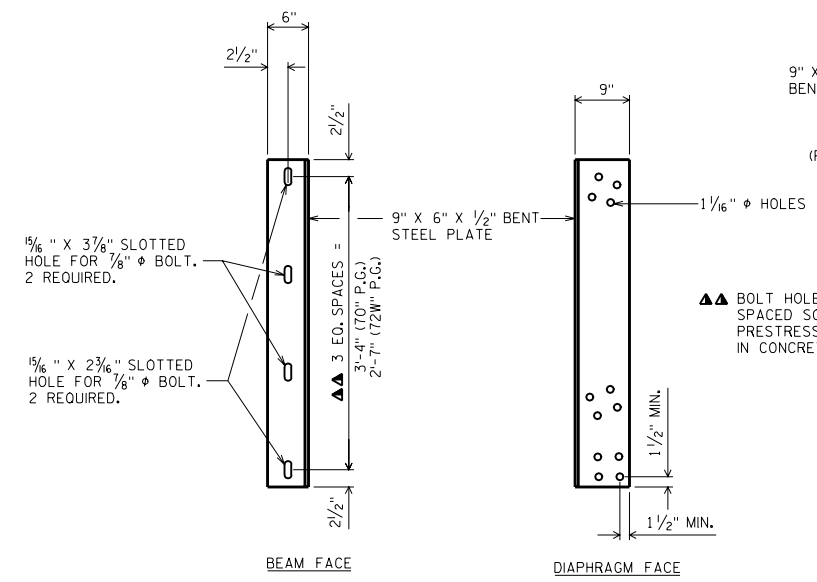
ALL DIAPHRAGM STRUCTURAL STEEL SHOWN SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563, LUBRICANT AND TEST FOR COATED NUTS.

FOR SPANS EQUAL TO OR LESS THAN 80'-0" PLACE ONE DIAPHRAGM AT MID-LENGTH OF GIRDER. FOR SPANS OVER 80'-0" PLACE AT 1/3 AND 2/3 POINTS.

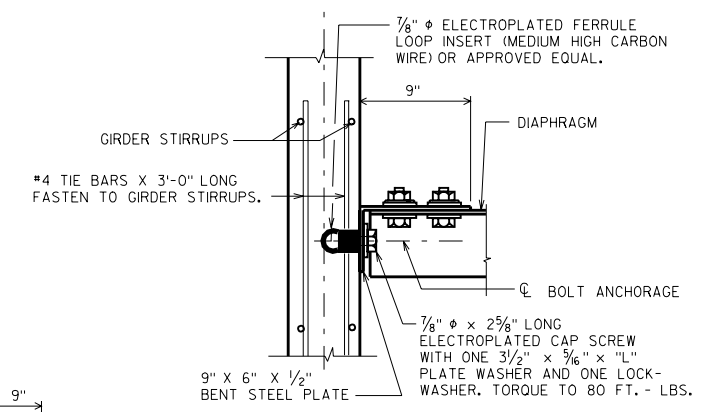


PLAN FOR SKEW ANGLES ≤ 10°

PLAN FOR SKEW ANGLES > 10°



DIAPHRAGM SUPPORT

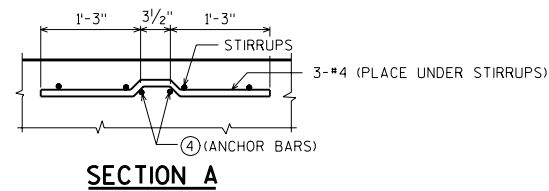
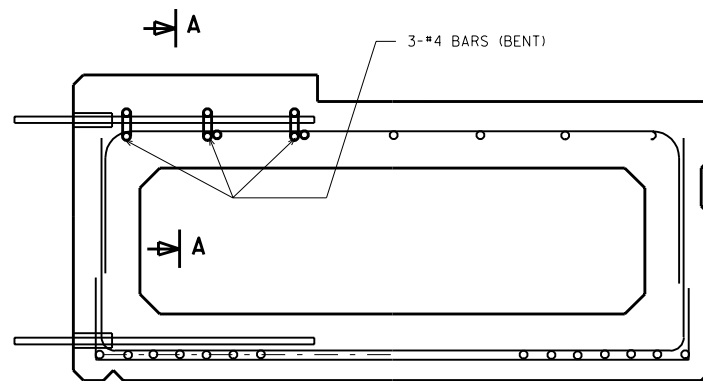


SECT. A-A
(FOR EXTERIOR ATTACHMENT)

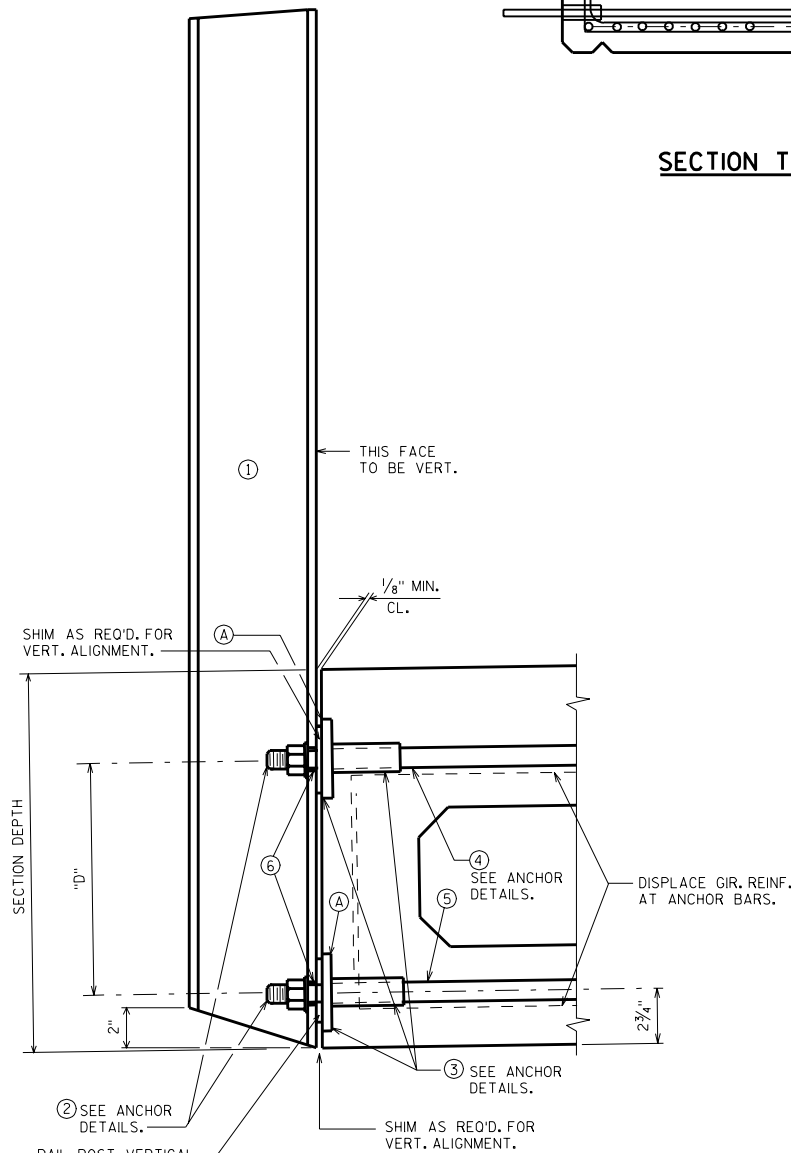
"L" = 3 1/2" ; TOP & BOTTOM BOLTS
"L" = 7" ; CENTER BOLTS

▲▲ BOLT HOLES SHALL BE SPACED SO AS TO MISS PRESTRESSED STRANDS IN CONCRETE BEAMS.

INTERMEDIATE STEEL DIAPHRAGMS FOR 70" & 72W" PRESTRESSED GIRDERS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/03

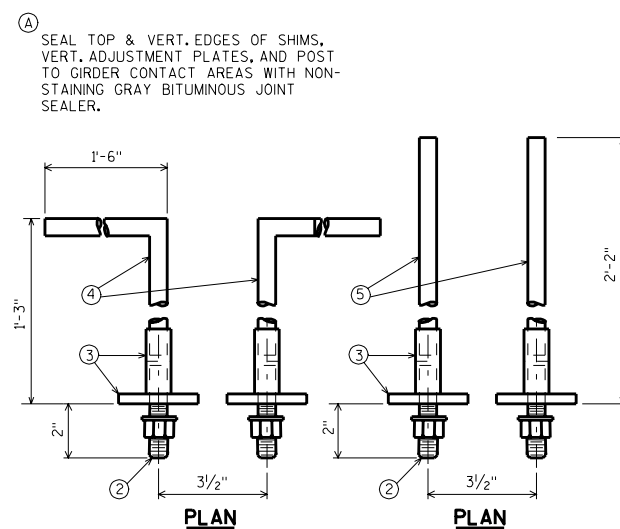


SECTION THRU EXTERIOR GIRDER



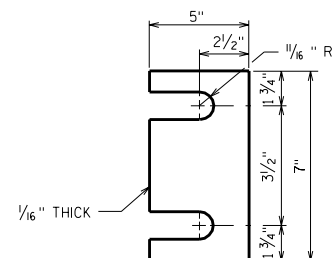
SECTION THRU RAILING

SECTION DEPTH	"D"
12"	7"
17"	12"
21"	16"
27"	22"
33"	28"
42"	37"



ANCHOR DETAILS

ANCHORS MAY BE FABRICATED IN A CAGE IF OPTED BY THE MFG'R.



**POST SHIM
DETAIL**
(14 PER POST)

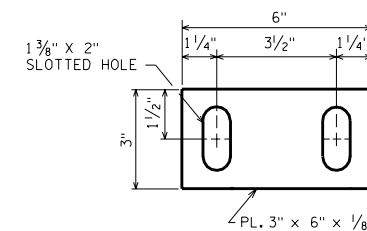
LEGEND

- ① W6 x 25. SEE STD. 30.1 OR 30.2 FOR RAILING ATTACHMENT. PLACE POSTS NORMAL TO GRADE LINE. PLACE POSTS VERTICAL.
 - ② 1" DIA. STUD WITH NUT & WASHER. FOUR REQ'D. PER POST, A325.*
 - ③ THREADED BAR COUPLER FOR 1" ϕ STUD. ACCEPTABLE PRODUCTS ARE WILLIAMS REBAR FLANGE COUPLERS BY WILLIAMS FORM ENGINEERING CORP. OR DOWEL BAR REPLACEMENTS BY DAYTON SUPERIOR. FOUR REQ'D. PER POST. EXPOSED FLANGE TO BE GALVANIZED.*
 - ④ ANCHOR BAR 1" DIA. THREADED REINFORCEMENT BAR BENT AS SHOWN IN ANCHOR DETAILS, GRADE 60. TWO REQ'D. PER POST. (TOP)**
 - ⑤ ANCHOR BAR, 1" DIA. THREADED REINFORCEMENT BAR (STRAIGHT), GRADE 60. TWO REQ'D. PER POST. (BOTTOM)**
 - ⑥ 1 1/4" x 1 3/4" SLOTTED HOLES IN POST FOR STUD NO. 2. LONG DIMENSION OF SLOTTED HOLE TO BE VERTICAL.
- *SHALL BE MECHANICALLY GALVANIZED OR ELECTRO-PLATED.
**NOT GALVANIZED OR ELECTRO-PLATED.

GENERAL NOTES

FILL BOLT SLOT OPENINGS IN POST SHIMS AND POSTS WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

STEEL POST SHIMS MAY BE USED AT POSTS WHERE REQ'D. FOR ALIGNMENT.



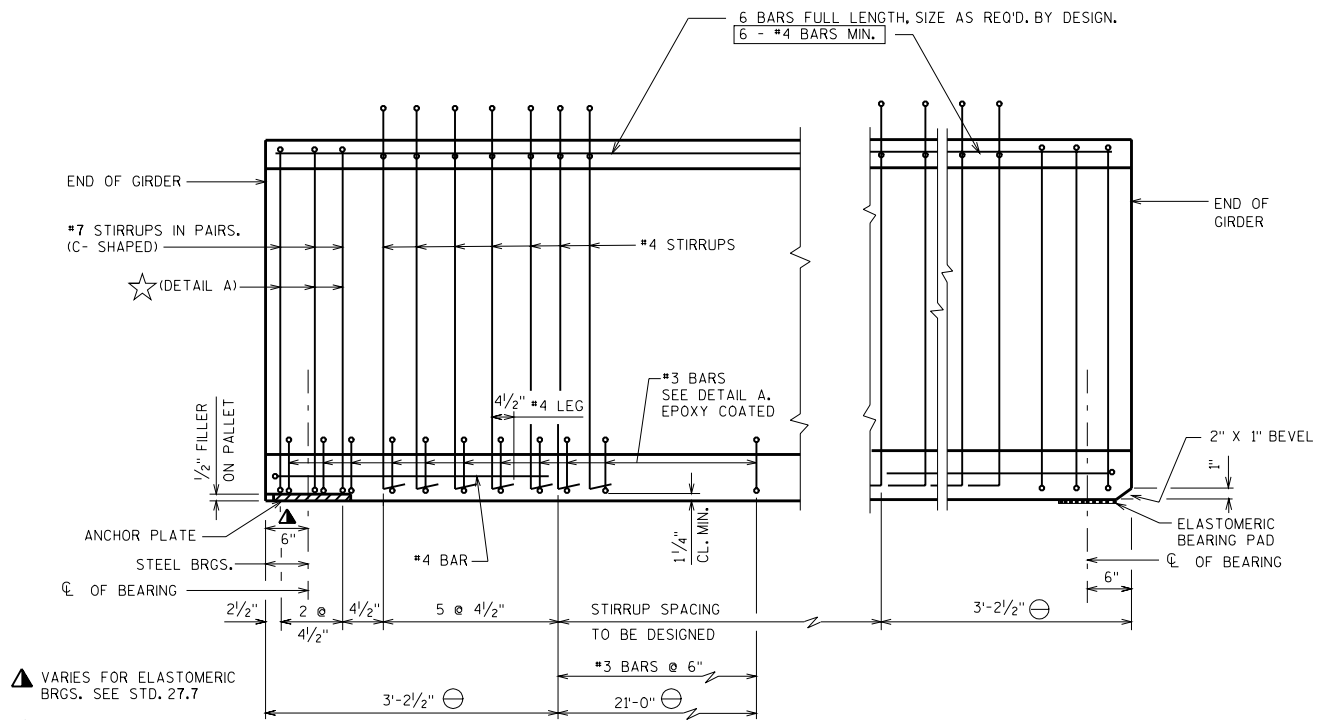
**RAIL POST VERTICAL
ADJUSTMENT PLATE**
(1 PER POST)

**PRETENSIONED SLAB & BOX
SECTION RAILING POST
ATTACHMENT**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

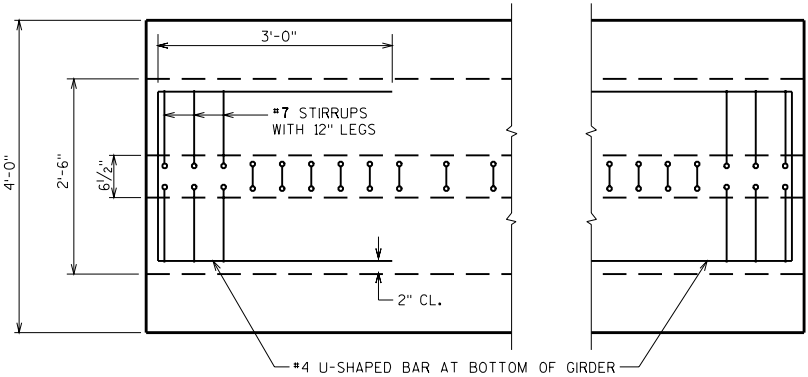
DATE:
1/99



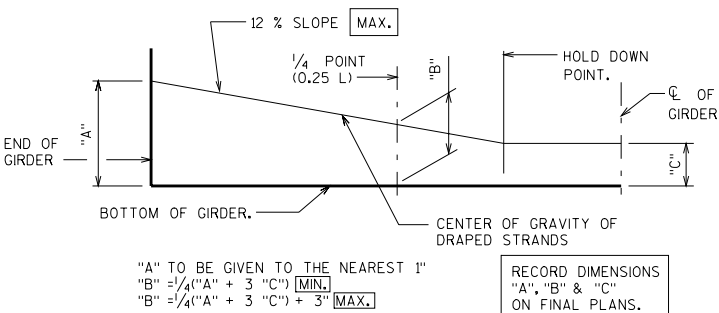
**SUPPORT WITH STEEL
OR ELASTOMERIC BRGS.**

**SUPPORT WITH
1/2" ELASTOMERIC BEARING PAD**

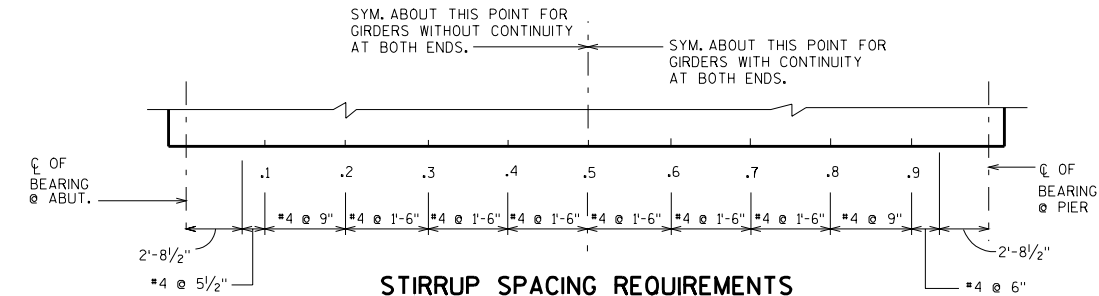
SIDE VIEW OF GIRDER



TOP VIEW OF GIRDER ENDS

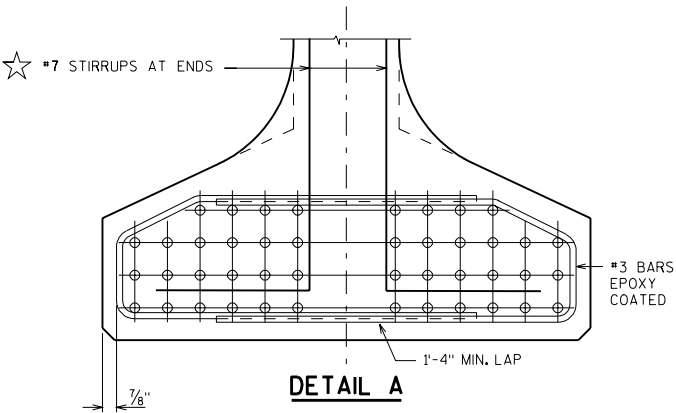


LOCATION OF DRAPED STRANDS

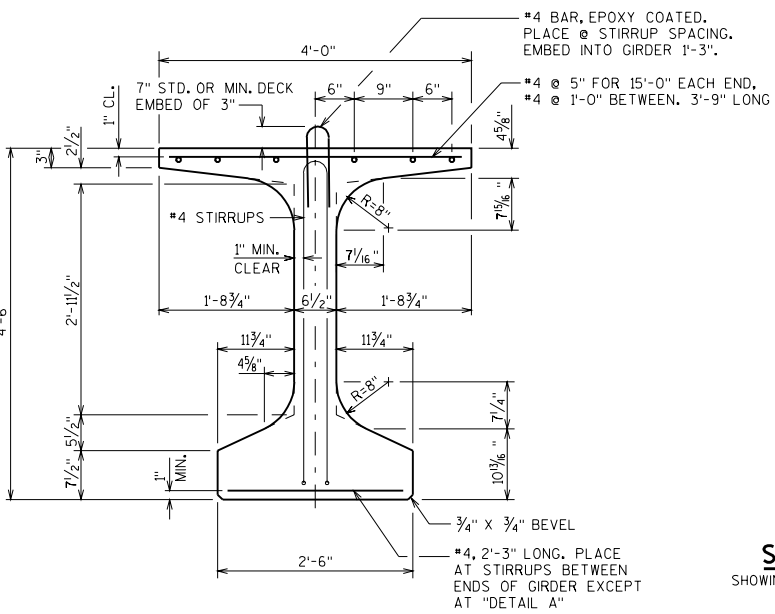


STIRRUP SPACING REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 107'-0" SPANS AND 12'-0" GIRDER SPACING, HS20 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #4 BARS AT 1'-6" AS MINIMUM STIRRUP AREA.

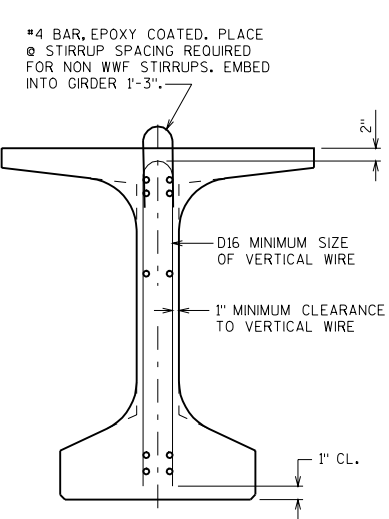


DETAIL A



SECTION THRU GIRDER

STRANDS NOT SHOWN



SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. [THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.]

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 15" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED LIQUID BOND BREAKER SHALL BE APPLIED TO THE TOP SURFACE OF THE GIRDER EXCEPT FOR THE CENTER 18". APPLY NO MORE THAN 7 DAYS PRIOR TO POURING THE DECK.

NOX-CRETE:
SILCOSEAL 2000 F (2 COATS)
MASTER BUILDERS:
FIRST COAT - PRECO FORM-COTE
SECOND COAT - RHEOFINISH 220

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION. (608) 266-8494

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

DESIGNER NOTES

BID ITEM SHALL BE "PRESTRESSED GIRDER, I TYPE, 54W-INCH".

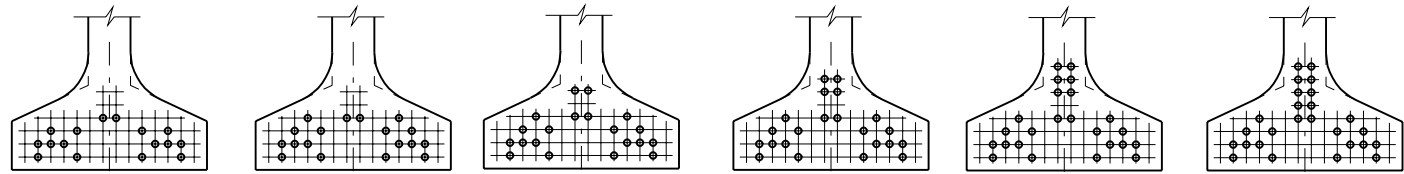
THE MAX. NUMBER OF DRAPED 0.5"φ STRANDS IS 12 AND FOR 0.6"φ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. USE 0.6" STRAND FOR ALL PATTERNS.

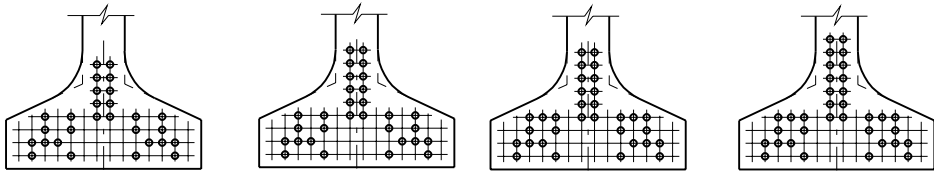
**54W" PRETENSIONED
GIRDER DETAILS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

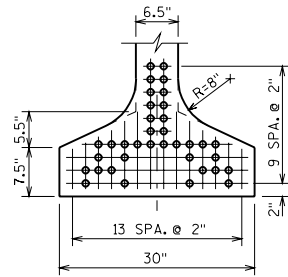
APPROVED: _____ DATE: 1/03



16 STRANDS 18 STRANDS 20 STRANDS 22 STRANDS 24 STRANDS 26 STRANDS

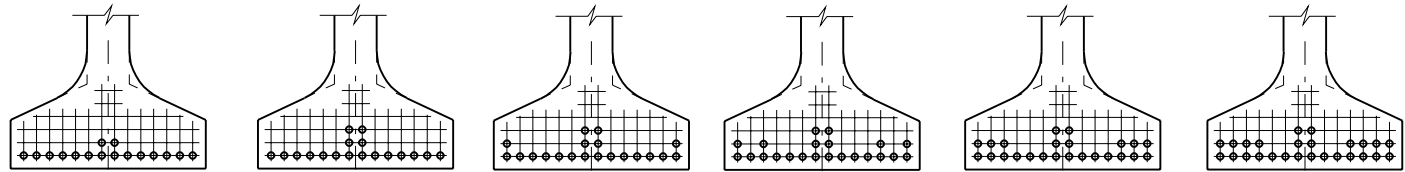


28 STRANDS 30 STRANDS 32 STRANDS 34 STRANDS

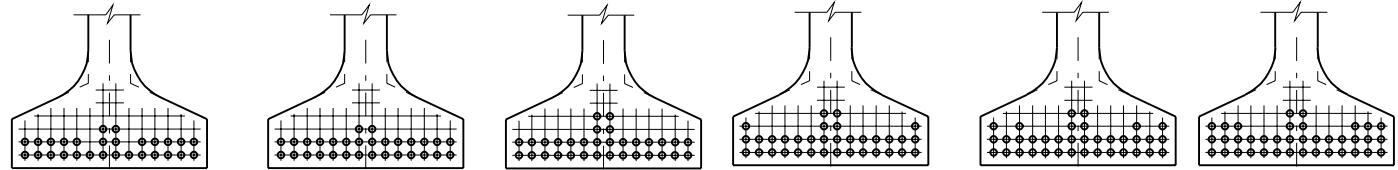


36 STRANDS

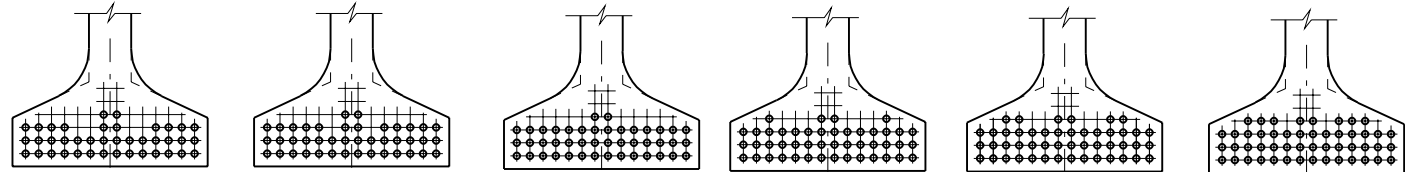
**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS**



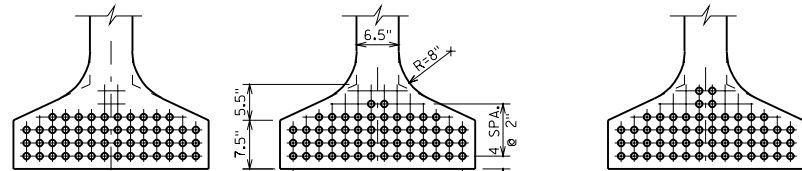
16 STRANDS 18 STRANDS 20 STRANDS 22 STRANDS 24 STRANDS 26 STRANDS



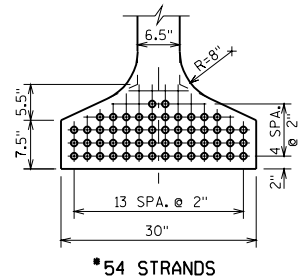
28 STRANDS 30 STRANDS 32 STRANDS 34 STRANDS 36 STRANDS 38 STRANDS



40 STRANDS 42 STRANDS 44 STRANDS 46 STRANDS 48 STRANDS 50 STRANDS



52 STRANDS *56 STRANDS



*54 STRANDS

ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED STRANDS

* $\frac{1}{2}$ " ϕ STRANDS ONLY

54" GIRDER

$A = 798 \text{ SQ. IN.}$

$r^2 = 402.41 \text{ IN.}^2$

$y_T = 27.70 \text{ IN.}$

$y_B = 26.30 \text{ IN.}$

$I = 321,049 \text{ IN.}^4$

$S_T = 11,592 \text{ IN.}^3$

$S_B = 12,205 \text{ IN.}^3$

$WT. = 831 \text{ \#/FT.}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$

$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
for low relaxation strands

Pi PER $\frac{1}{2}$ " ϕ STRAND = $0.1531 \times 202,500 = 31.00 \text{ KIPS}$

Pi PER 0.6" ϕ STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

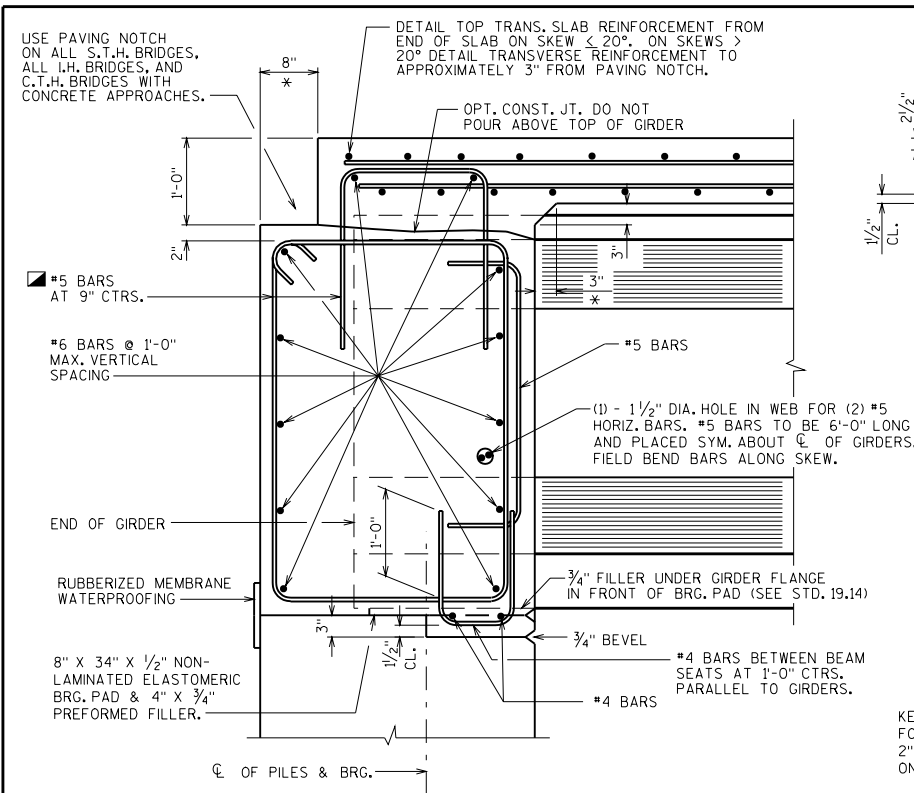
(COMPRESSION IS NEGATIVE)

N	(1)
NO. STRANDS	e_s (inches)
STANDARD PATTERNS FOR UNDRAPED STRANDS	
16	21.80
18	21.41
20	20.70
22	19.94
24	19.12
26	18.92
28	18.87
30	18.17
32	18.18
34	17.48
36	17.52
STANDARD PATTERNS FOR DRAPED STRANDS	
16	24.05
18	23.63
20	23.50
22	23.39
24	23.30
26	23.22
28	23.16
30	23.10
32	22.80
34	22.65
36	22.52
38	22.41
40	22.30
42	22.20
44	22.12
46	21.95
48	21.80
50	21.66
52	21.53
54	21.34
56	21.09

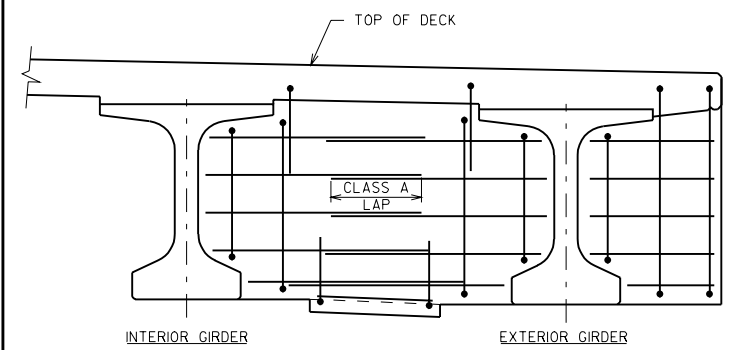
**54W" PRETENSIONED GIRDER
DESIGN DATA**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

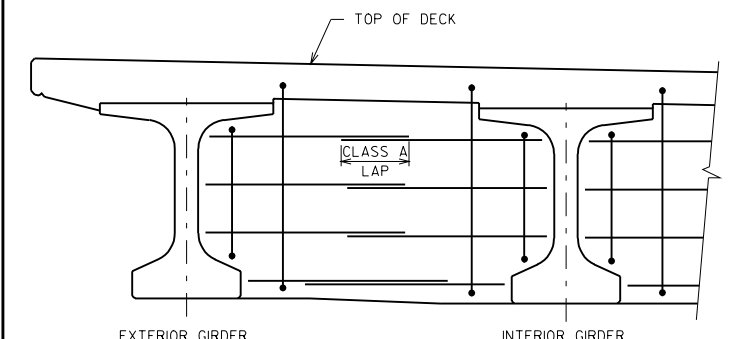
APPROVED: _____ DATE: 6/02



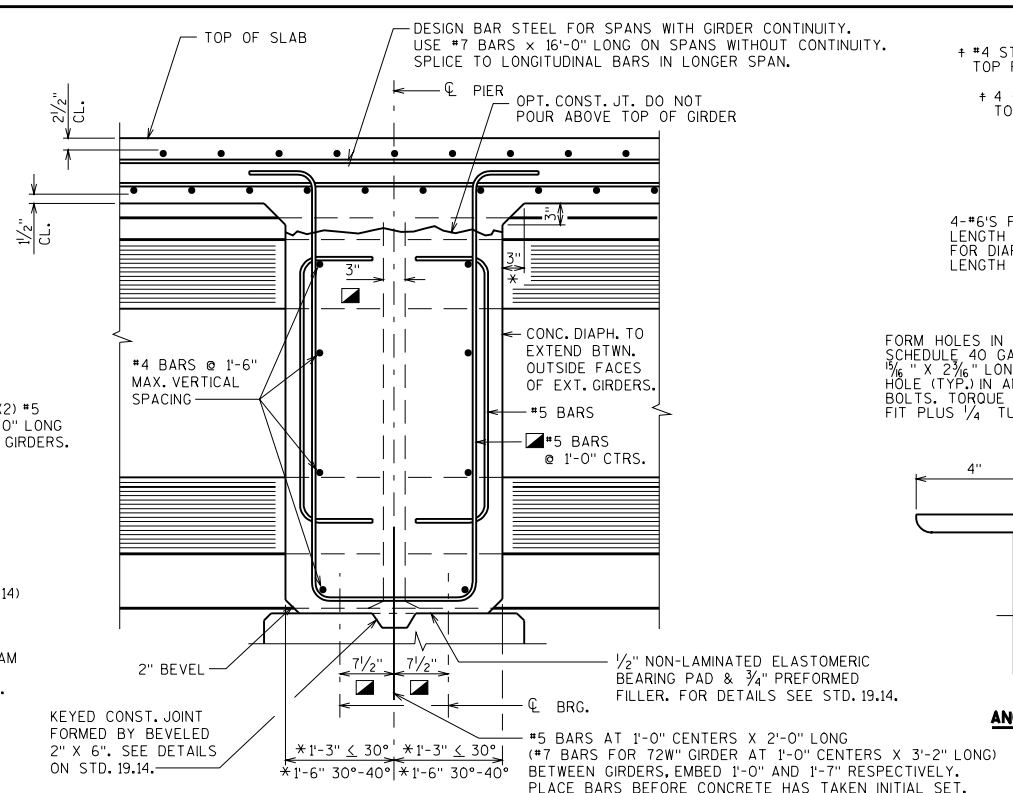
PRESTRESSED GIRDER WITH SEMI-EXPANSION SEAT



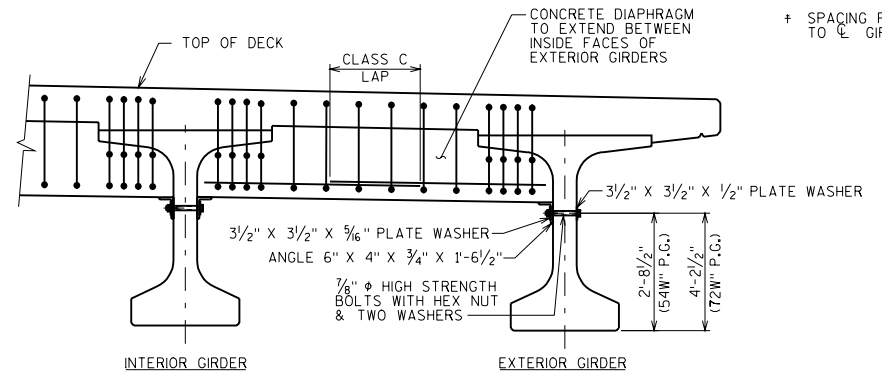
PART TRANSVERSE SECTION AT DIAPHRAGM SEMIEXPANSION END



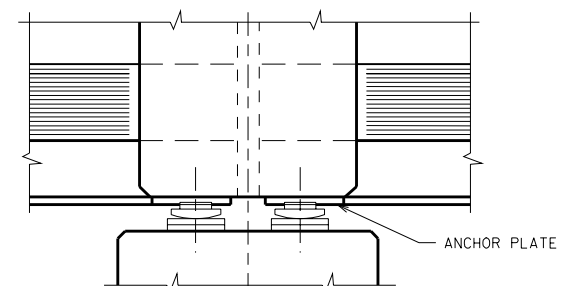
PART TRANSVERSE SECTION AT DIAPHRAGM PIER



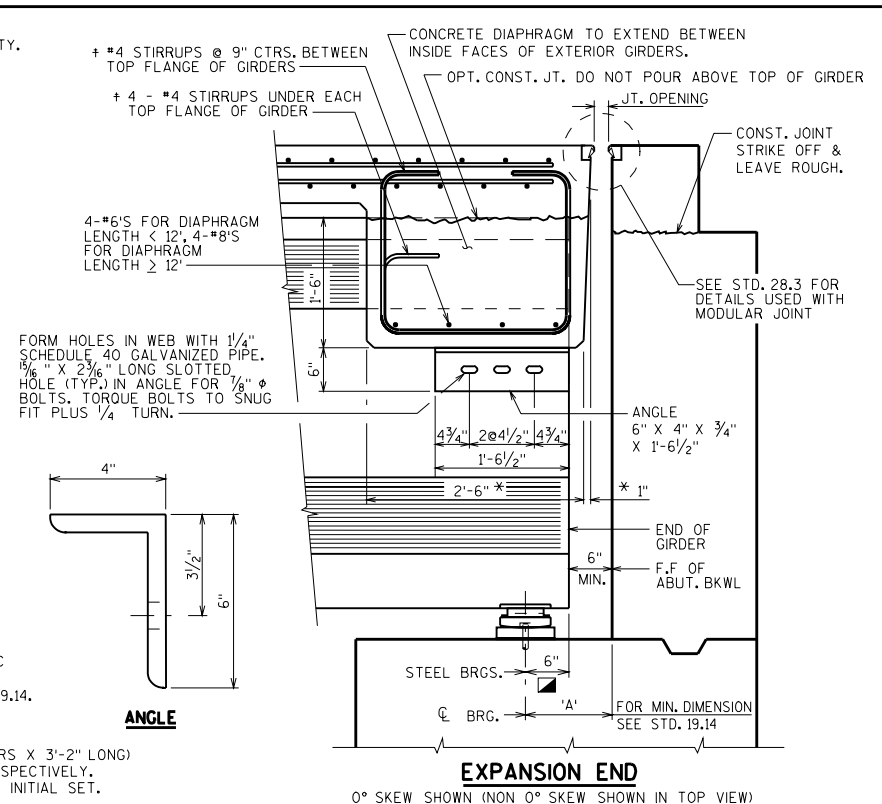
DIAPHRAGM AT 1/2" ELASTOMERIC BEARING



PART TRANSVERSE SECTION AT DIAPHRAGM EXPANSION END

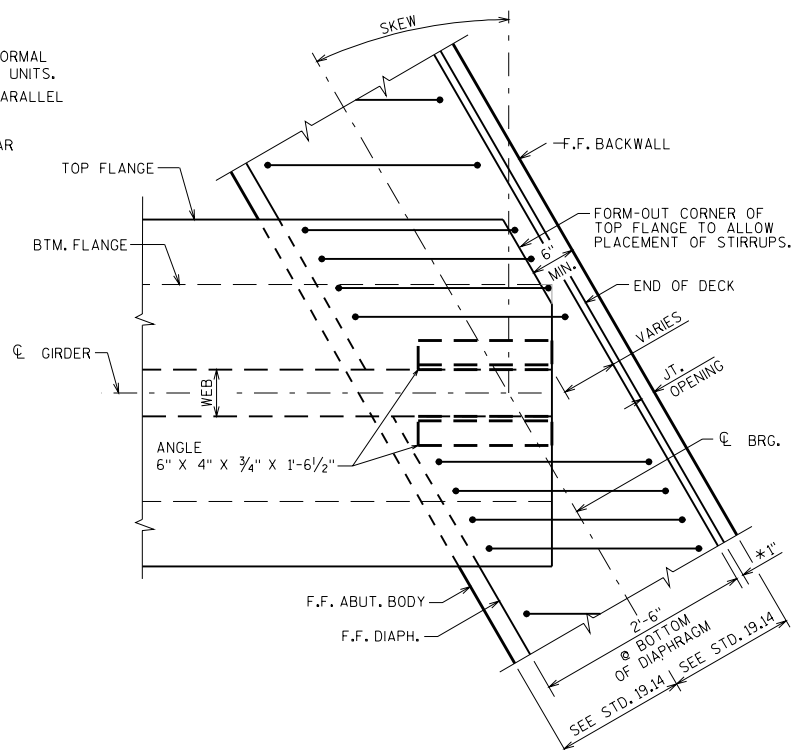


DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS SECTION THRU HAUNCH AT PIER



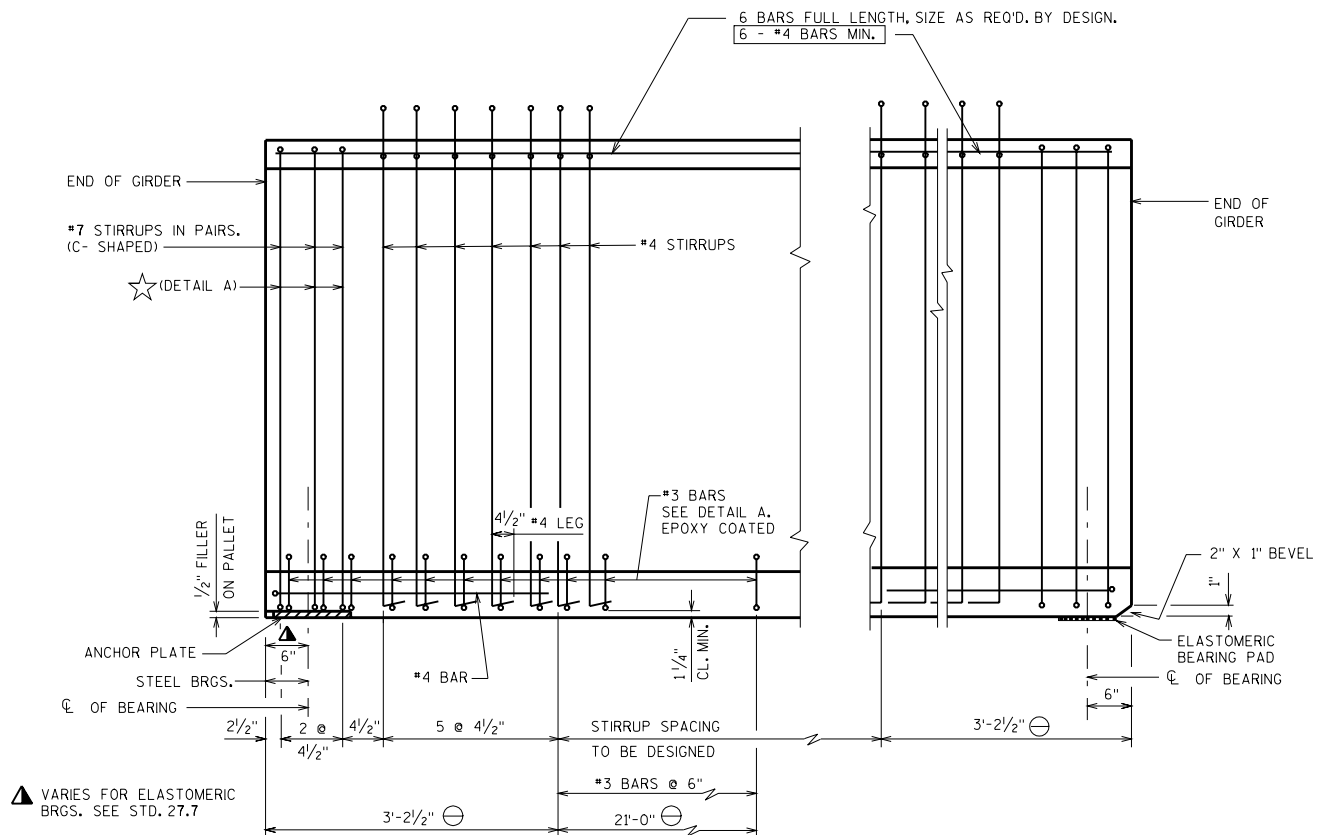
LEGEND

- * DIMENSION IS TAKEN NORMAL TO CL. SUBSTRUCTURE UNITS.
- DIMENSION IS TAKEN PARALLEL TO CL. GIRDER.
- + SPACING PERPENDICULAR TO CL. GIRDERS



TOP VIEW OF DIAPHRAGM (EXPANSION END)

PRETENSIONED 54W" & 72W" GIRDER SLAB & SUPERSTRUCTURE DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1-03



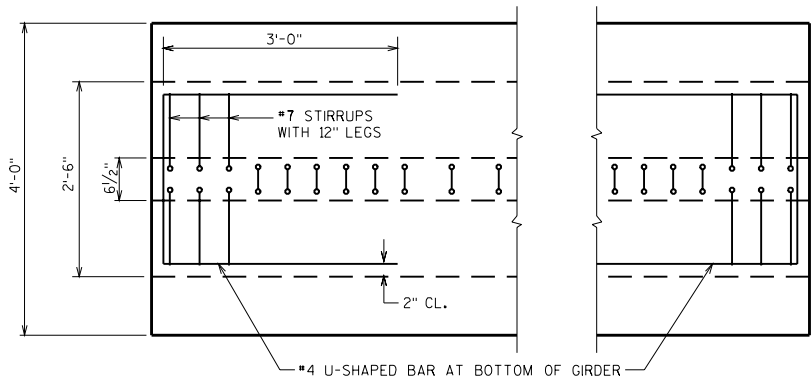
SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD

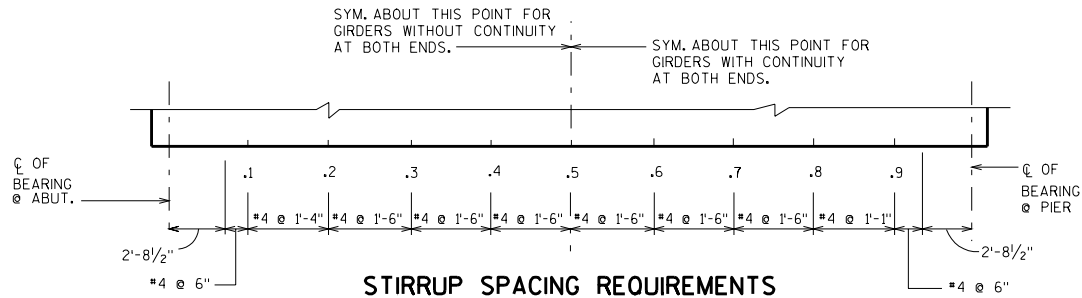
SIDE VIEW OF GIRDER

▲ VARIES FOR ELASTOMERIC BRGS. SEE STD. 27.7

⊖ DETAIL TYPICAL AT EACH END

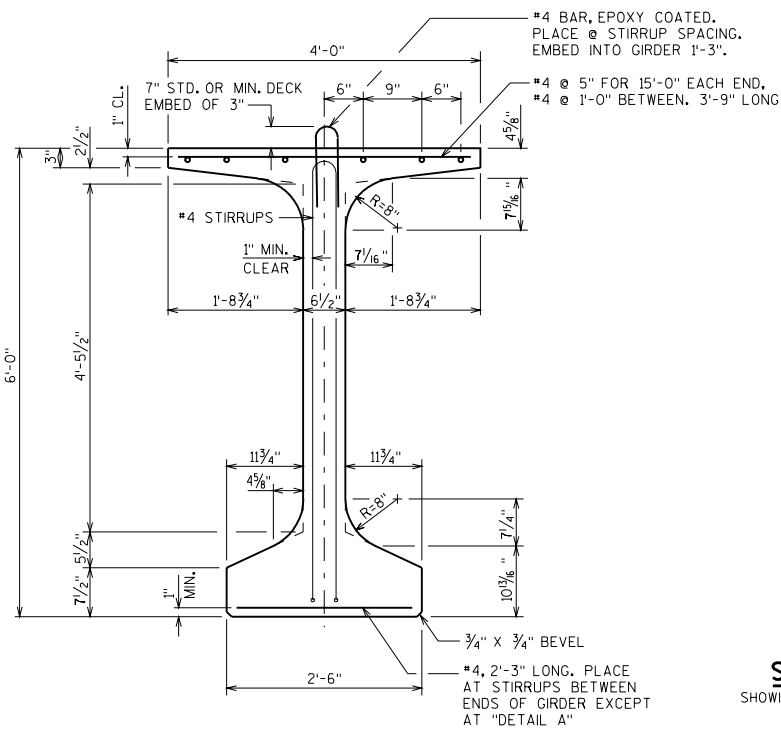


TOP VIEW OF GIRDER ENDS



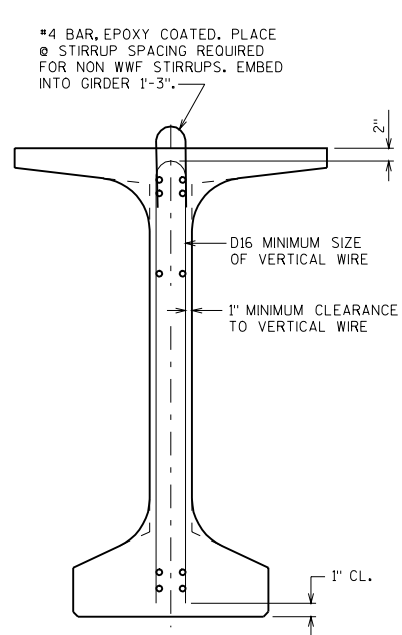
STIRRUP SPACING REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 122'-0" SPANS AND 12'-0" GIRDER SPACING, HS20 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #4 BARS AT 1'-6" AS MINIMUM STIRRUP AREA.



SECTION THRU GIRDER

STRANDS NOT SHOWN



SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

GENERAL NOTES

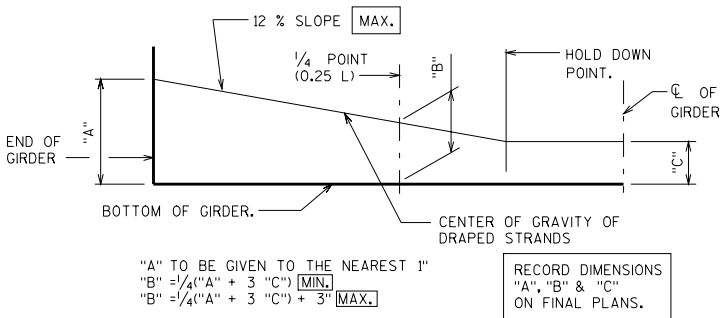
- THESE NOTES APPLY TO ALL GIRDERS.
- THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.
- STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. [THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.]
- TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 15" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED LIQUID BOND BREAKER SHALL BE APPLIED TO THE TOP SURFACE OF THE GIRDER EXCEPT FOR THE CENTER 18". APPLY NO MORE THAN 7 DAYS PRIOR TO POURING THE DECK.
- NOX-CRETE:
SILCOSEAL 2000 F (2 COATS)
- MASTER BUILDERS:
FIRST COAT - PRECO FORM-COTE
SECOND COAT - RHEOFINISH 220
- SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS ARE AVAILABLE:
1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
 2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION. (608) 266-8494
- AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

DESIGNER NOTES

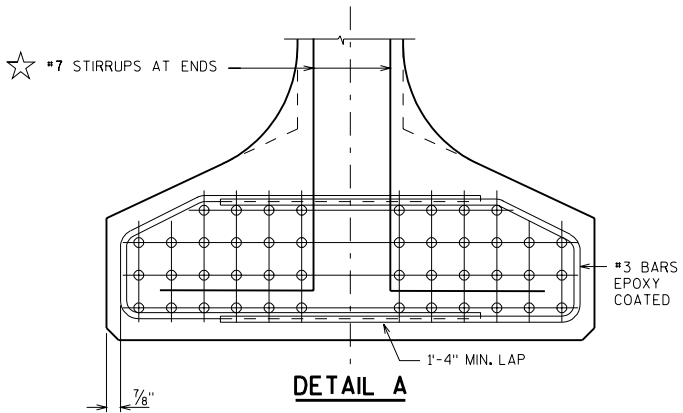
BID ITEM SHALL BE "PRESTRESSED GIRDER, I TYPE, 72W-INCH".

THE MAX. NUMBER OF DRAPED 0.5"φ STRANDS IS 12 AND FOR 0.6"φ STRANDS THE MAX. IS 8.

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. USE 0.6" STRAND FOR ALL PATTERNS.



LOCATION OF DRAPED STRANDS

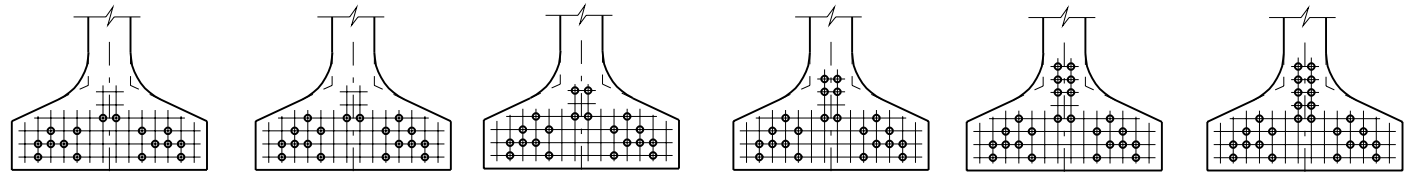


DETAIL A

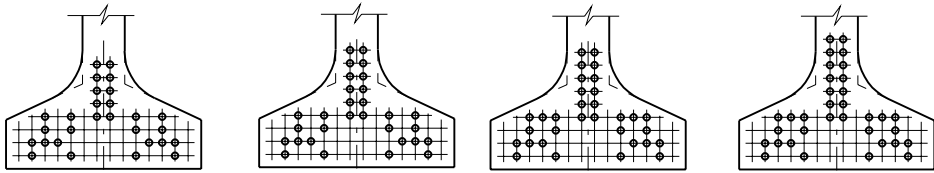
72W" PRETENSIONED GIRDER DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

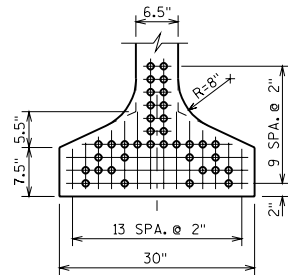
APPROVED: _____ DATE: 1/03



16 STRANDS 18 STRANDS 20 STRANDS 22 STRANDS 24 STRANDS 26 STRANDS

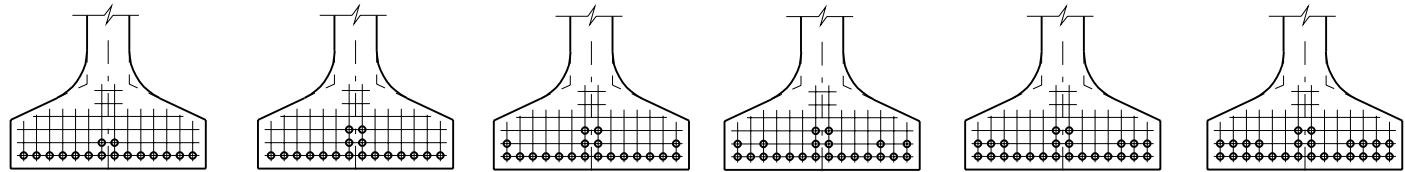


28 STRANDS 30 STRANDS 32 STRANDS 34 STRANDS

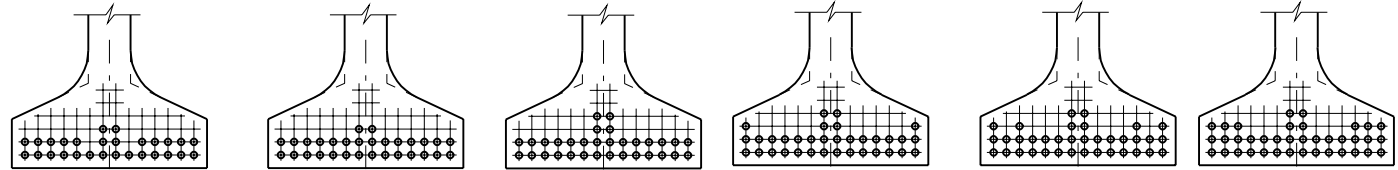


36 STRANDS

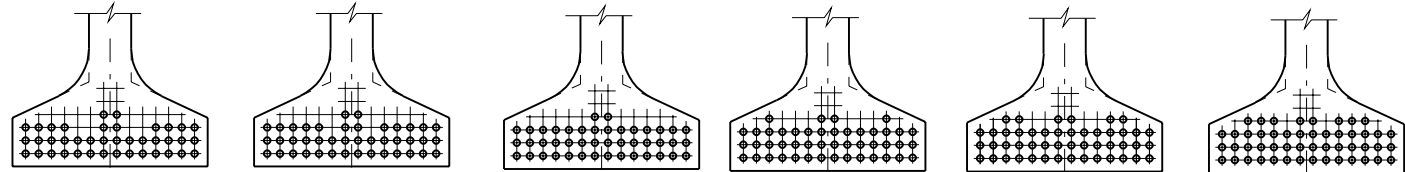
**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS**



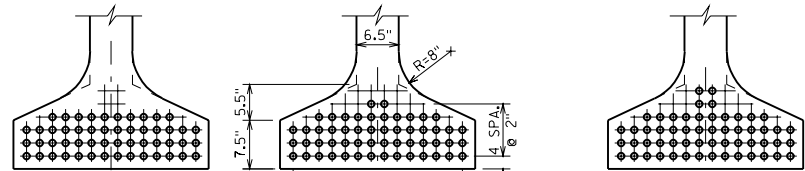
16 STRANDS 18 STRANDS 20 STRANDS 22 STRANDS 24 STRANDS 26 STRANDS



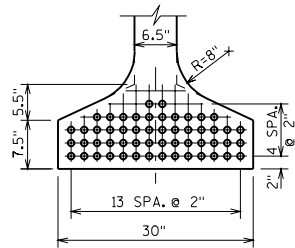
28 STRANDS 30 STRANDS 32 STRANDS 34 STRANDS 36 STRANDS 38 STRANDS



40 STRANDS 42 STRANDS 44 STRANDS 46 STRANDS 48 STRANDS 50 STRANDS



52 STRANDS



54 STRANDS

56 STRANDS

ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED STRANDS

• $\frac{1}{2}$ " ϕ STRANDS ONLY

72W" GIRDER

$A = 915 \text{ SQ. IN.}$

$r^2 = 717.5 \text{ IN.}^2$

$y_T = 37.13 \text{ IN.}$

$y_B = 34.87 \text{ IN.}$

$I = 656,426 \text{ IN.}^4$

$S_T = 17,680 \text{ IN.}^3$

$S_B = 18,825 \text{ IN.}^3$

$WT. = 953 \text{ \#/FT.}$

PRE-TENSION

$f'_s = 270,000 \text{ P.S.I.}$

$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$
for low relaxation strands

Pi PER $\frac{1}{2}$ " ϕ STRAND = $0.1531 \times 202,500 = 31.00 \text{ KIPS}$

Pi PER 0.6" ϕ STRAND = $0.217 \times 202,500 = 43.94 \text{ KIPS}$

(COMPRESSION IS NEGATIVE)

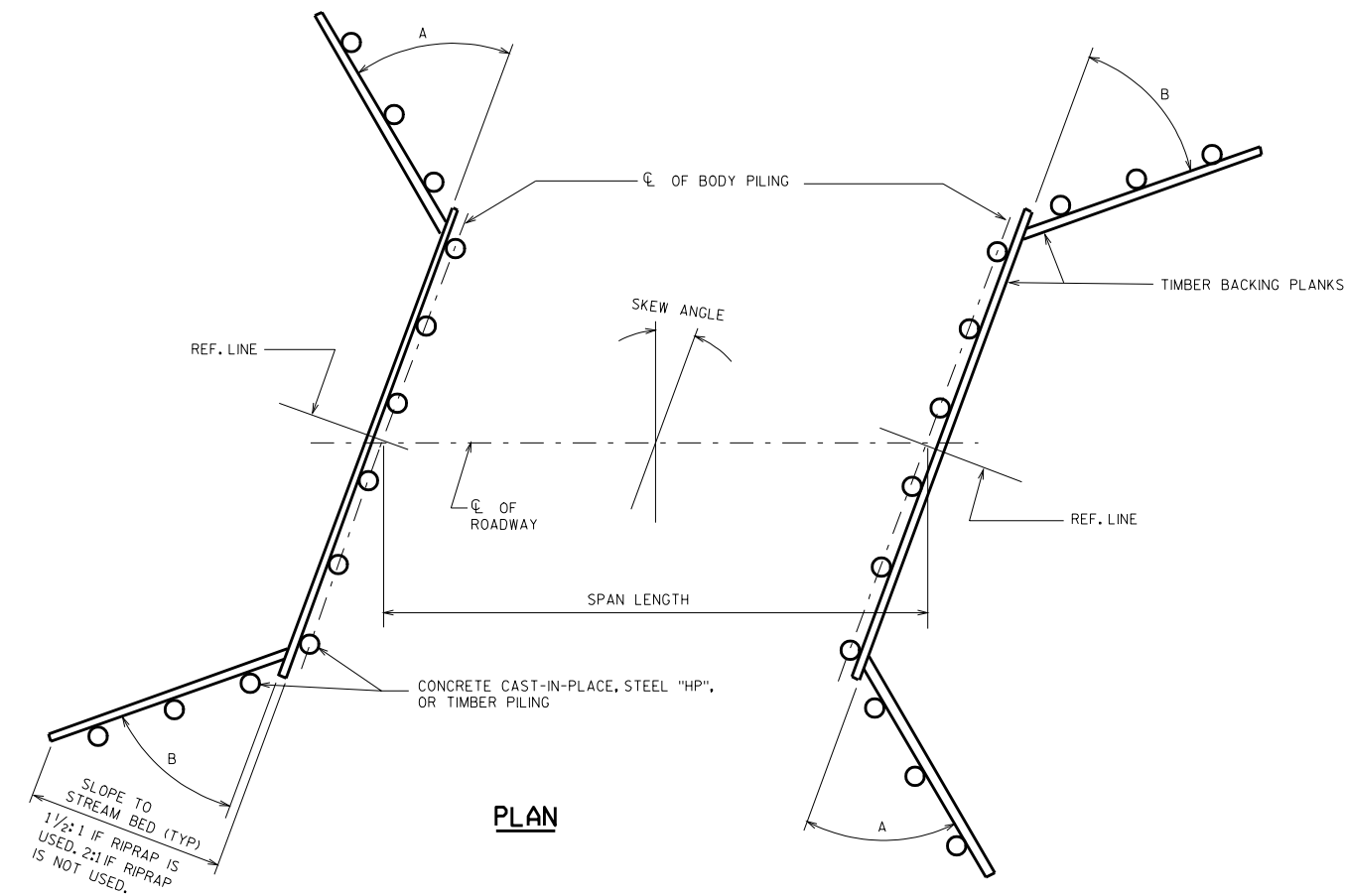
N	(1)
NO. STRANDS	e_s (inches)
STANDARD PATTERNS FOR UNDRAPED STRANDS	
16	30.37
18	29.98
20	29.27
22	28.51
24	27.69
26	27.49
28	27.44
30	26.74
32	26.75
34	26.05
36	26.09
STANDARD PATTERNS FOR DRAPED STRANDS	
16	32.62
18	32.20
20	32.07
22	31.96
24	31.87
26	31.79
28	31.73
30	31.67
32	31.37
34	31.22
36	31.09
38	30.98
40	30.87
42	30.77
44	30.69
46	30.52
48	30.37
50	30.23
52	30.10
54	29.91
56	29.66

**72W" PRETENSIONED GIRDER
DESIGN DATA**

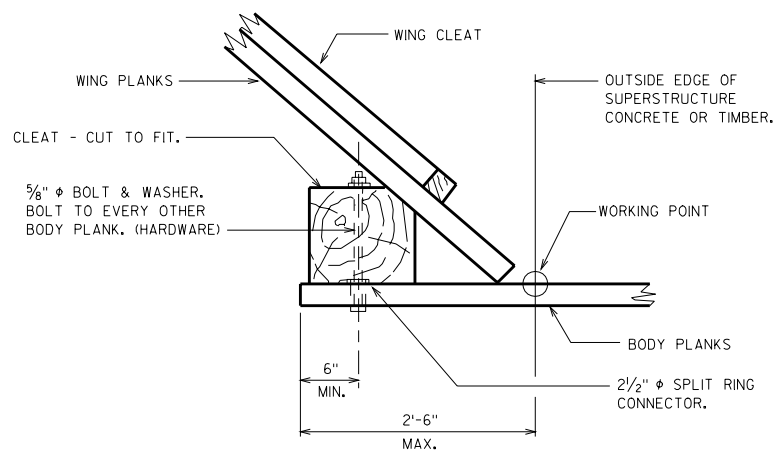
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PLAN



CORNER DETAIL

NOTES

- ALL TIMBER CONNECTORS AND HARDWARE EXCEPT THOSE OF MALLEABLE IRON SHALL BE GALVANIZED.
- TREAT ALL LUMBER AND TIMBER WITH ONE OF THE PRESERVATIVES RECOMMENDED IN THE CONSTRUCTION SPECIFICATIONS.
- TIE RODS SHALL BE COATED WITH THE COAL TAR OR BITUMASTIC COMPOUND USED FOR COVERING WING PILE ENDS.
- REFER TO A.A.S.H.T.O. SPECIFICATIONS FOR ALLOWABLE LUMBER AND TIMBER STRESSES.
- THE BODY BACKING PLANKS SHALL BE CONTINUOUS OVER 4 PILES (3 PANELS). PLANK SPLICES, IF REQUIRED SHALL BE AT THE CENTERLINE OF PILING AND ADJACENT SPLICES SHALL BE STAGGERED.
- ALL TIE RODS, TURNBUCKLES, NUTS AND WASHERS SHALL BE PAID FOR AS "STRUCTURAL CARBON STEEL".
- TIMBER CONNECTORS AND HARDWARE SHALL BE INCLUDED IN THE COST FOR "TREATED LUMBER AND TIMBER".
- ALTERNATE DETAILS MAY BE SUBMITTED USING EITHER GALVANIZED STEEL BRIDGE PLANK OR PRECAST CONCRETE PLANK IN LIEU OF TIMBER BACKED ABUTMENT PLANKING, SUBJECT TO APPROVAL BY THE ENGINEER.

SKEW ANGLE	"H" HEIGHT FROM STREAM BED OR BERM TO GRADE	WING ANGLE "A"	WING ANGLE "B"
0° TO 15° INCL.	$H \leq 10'-0"$	45°	45°
0° TO 15° INCL.	* $H > 10'-0"$	50°	50°
15° TO 20° INCL.	$H \leq 10'-0"$	55°	30°
15° TO 20° INCL.	* $H > 10'-0"$	50°	50°
OVER 20°	$H \leq 10'-0"$	65°	25°
OVER 20°	● $H > 10'-0"$	65°	25°

- * USE TIE RODS ON WING PILING
- USE TIE RODS WITH A DEADMAN ON WING PILING.

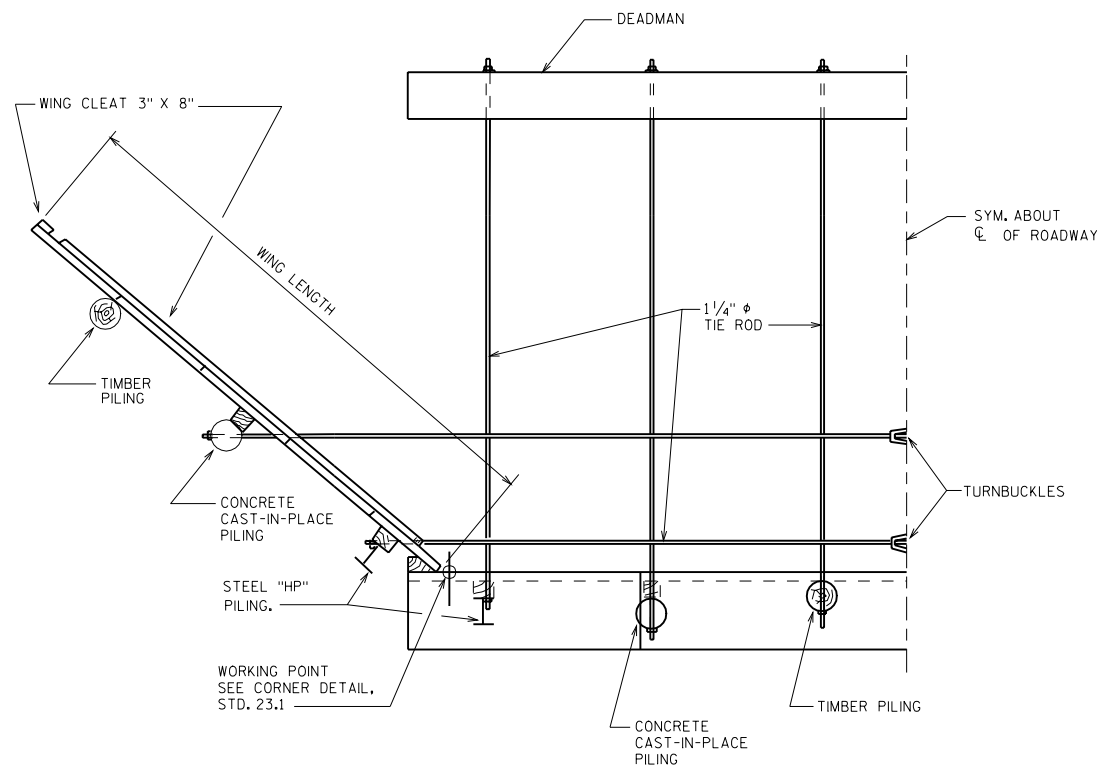
SECTION	MOMENT CAPACITY (INCH - KIPS/FT.)
3" TIMBER	21.6 ($f_b = 1.2$ K.S.I.)
4" TIMBER	38.4 ($f_b = 1.2$ K.S.I.)
10 GAGE (6' x 2') GRADE A * ARMC0	22.9 ($f_b = 18$ K.S.I.)
7 GAGE (6' x 2') GRADE A * ARMC0	30.0 ($f_b = 18$ K.S.I.)

*A.S.T.M. A446

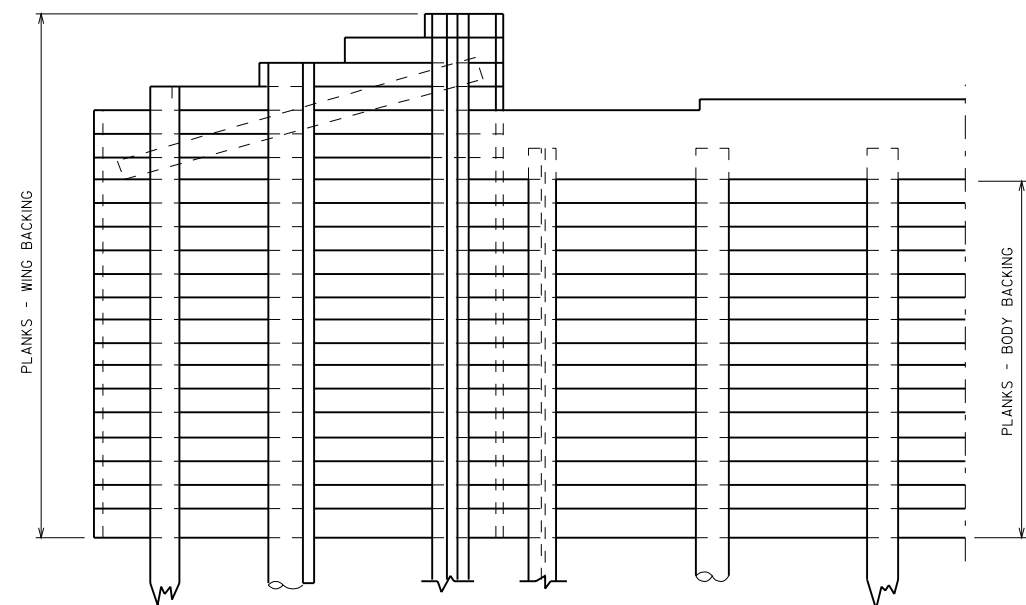
TIMBER ABUTMENTS
GENERAL

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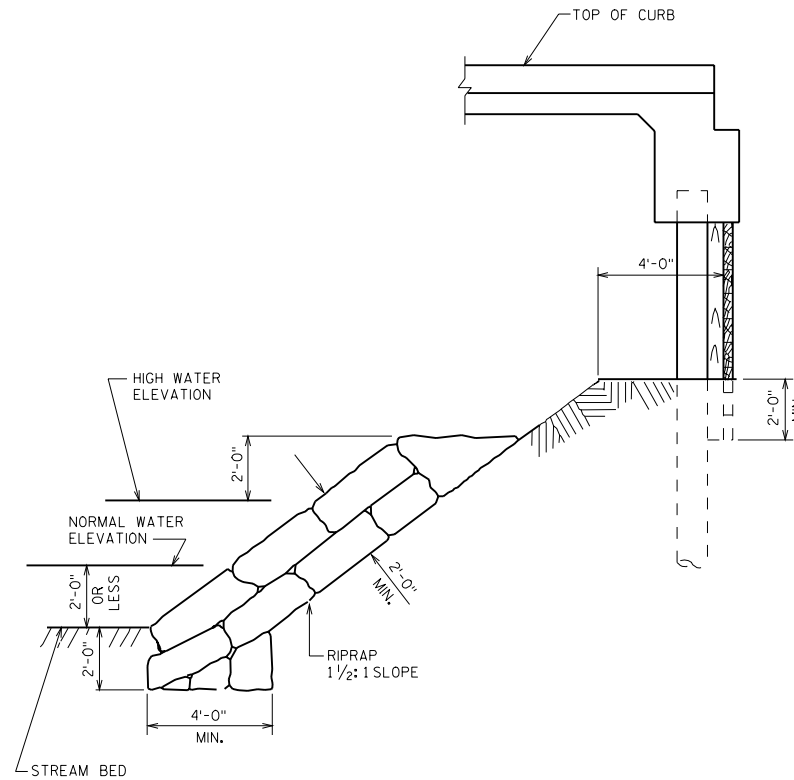
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HALF PLAN

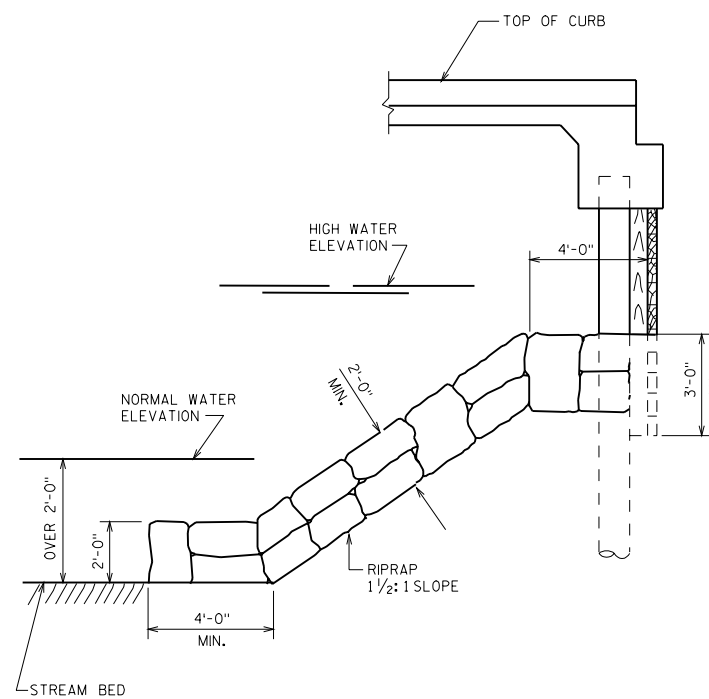


HALF ELEVATION



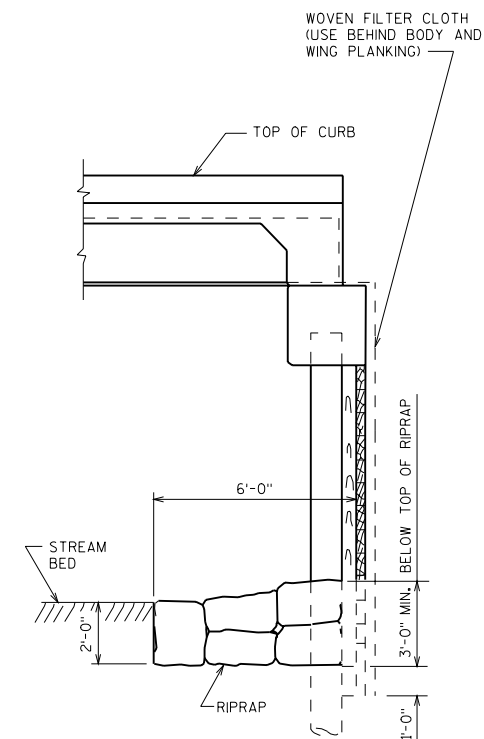
LONGITUDINAL SECTION WITH BERM

SHOWING TOE OF RIPRAP WHEN WATER IS 2'-0" OR LESS IN DEPTH.



LONGITUDINAL SECTION WITH BERM

SHOWING TOE OF RIPRAP WHEN WATER IS OVER 2'-0" IN DEPTH.

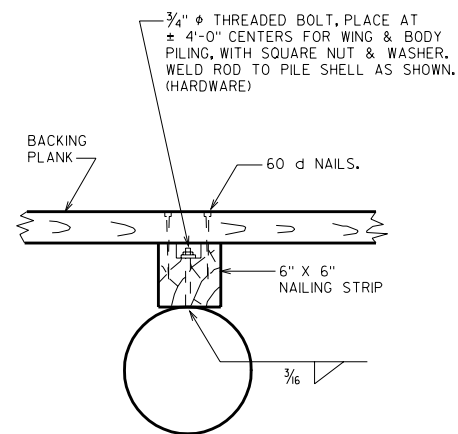


LONGITUDINAL SECTION WITHOUT BERM

TIMBER ABUTMENT

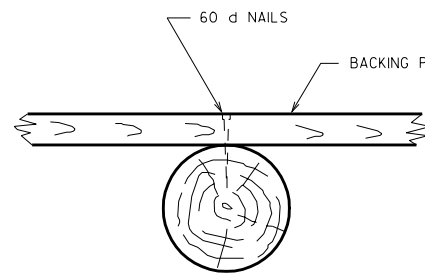
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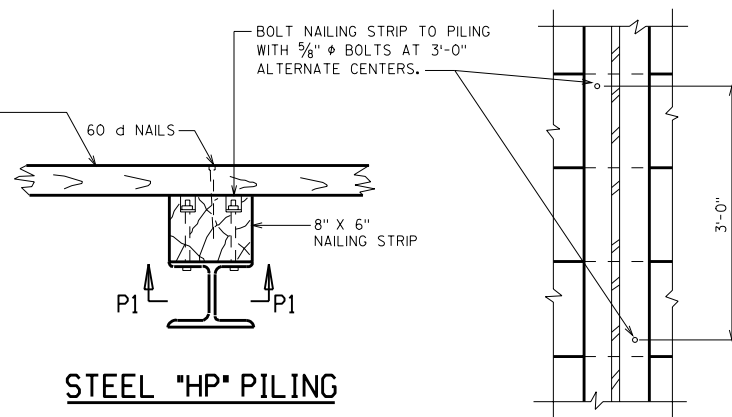


**CONCRETE
CAST-IN-PLACE PILING**

REFER TO STANDARD 11.1 FOR SECTION
THRU REINFORCED CAST-IN-PLACE PILING
WHEN PILES ARE EXPOSED.

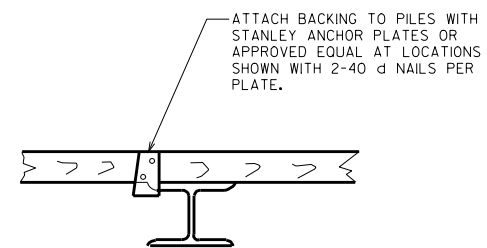


TIMBER PILING



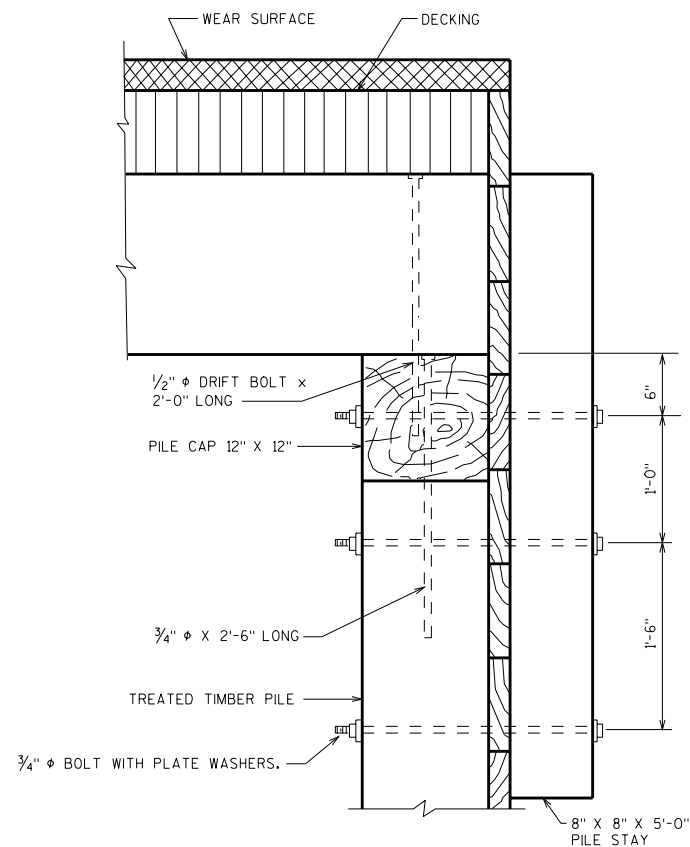
STEEL "HP" PILING

SECTION P1

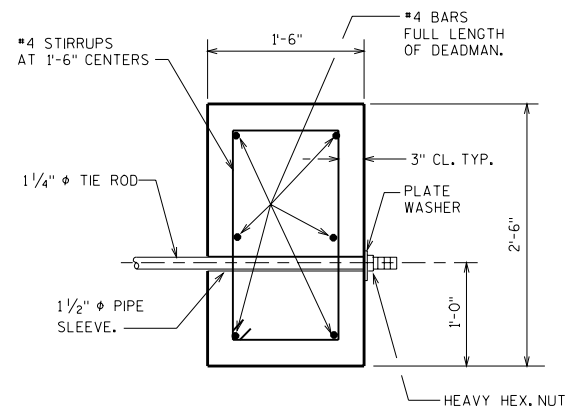


**STEEL "HP" PILING
(ALTERNATE ATTACHMENT)**

BODY & WING PLANK CONNECTION DETAILS



**PILE CAP DETAIL
(TIMBER GIRDER)**



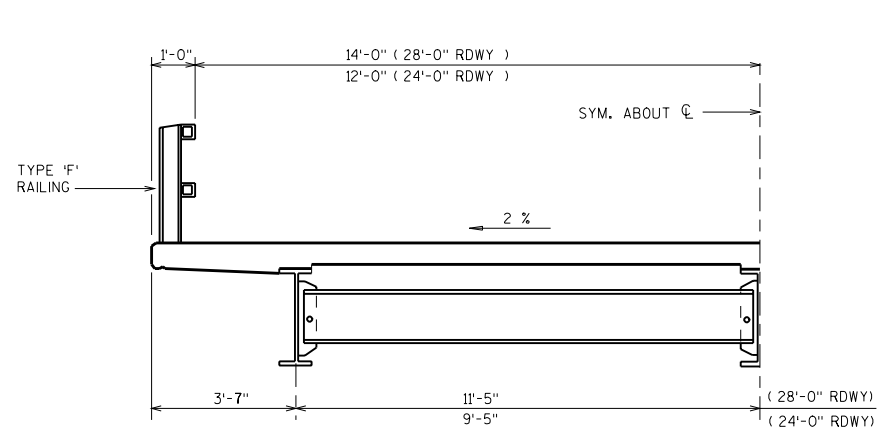
SECTION THRU DEADMAN

**TIMBER ABUTMENT
DETAILS**

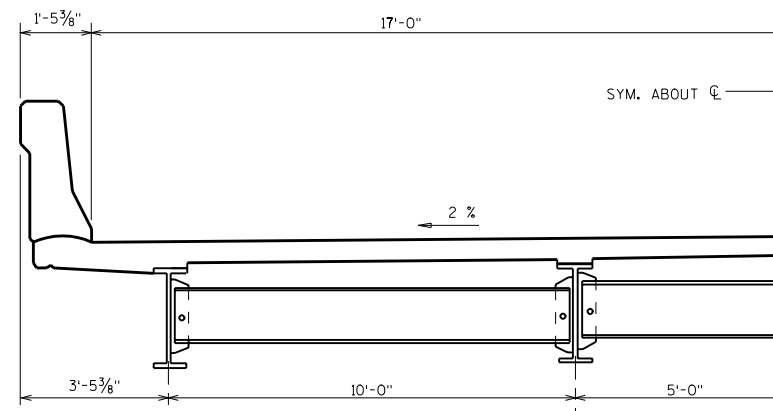
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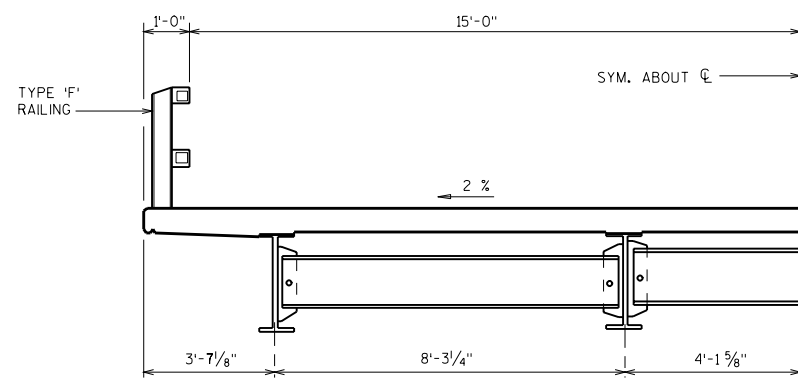
DATE:
1/99



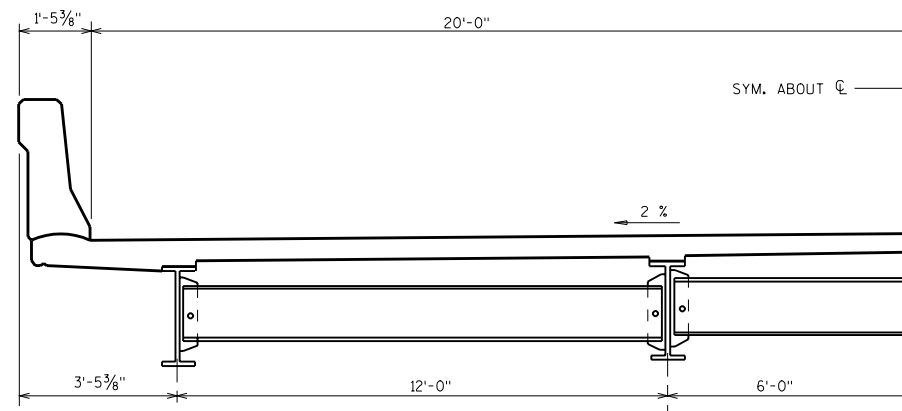
24'-0" & 28'-0" ROADWAY



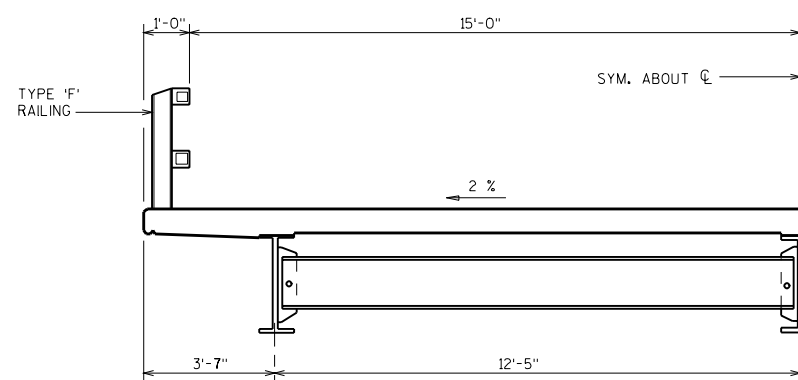
34'-0" ROADWAY



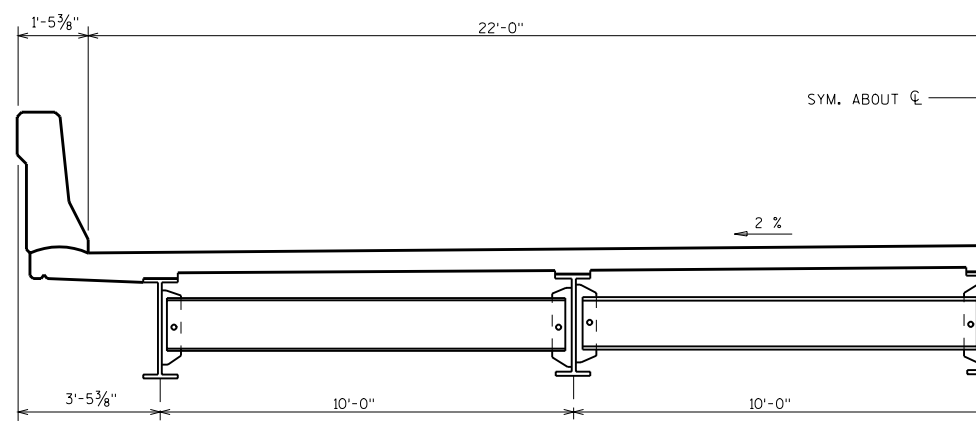
30'-0" ROADWAY



40'-0" ROADWAY



30'-0" ROADWAY



44'-0" ROADWAY

NOTES

GIRDER SPACINGS SHOWN MAY BE MODIFIED BY THE DESIGNER. IF OTHER SPACINGS RESULT IN A MORE ECONOMICAL SECTION.

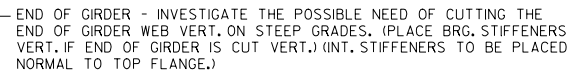
SEE CHAPTER 17 IN THE BRIDGE MANUAL FOR DECK THICKNESS.

**STEEL GIRDER
SUPERSTRUCTURE SECTIONS**

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NOTE: USE THREE SHOP OR FIELD WELDED
7/8" DIA. X 4" LONG \ominus STUDS EQUALLY
SPACED WITH A MIN. OF 1 1/2" CL. FROM THE
FLANGE EDGE. STUDS SHALL NOT BE PLACED
OVER FIELD SPLICE PLATES.



Diagram illustrating a beam-to-column connection detail. The connection shows a sloped weld on the top flange of the beam, extending 2'-0" horizontally, and a vertical weld on the column web, extending 2" vertically. A note indicates: GRIND WELD SMOOTH WITH MIN. 2" RADIAL TRANSITION. The column web is labeled.

DETAIL A
CONNECTION STIFFENER
DETAIL @ TENSION FLANGE

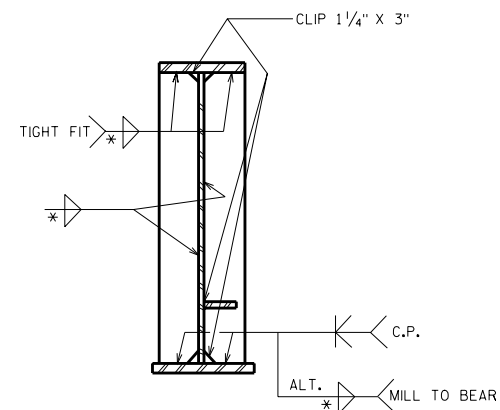


Diagram illustrating the stiffener welded to the web of a beam, showing various components and labels:

- CLIP CORNERS $1\frac{1}{4}" \times 3"$
- FILLET WELD INTER. STIFF. TO COMPRESSION FLG. AND TIGHT FIT TO TENSION FLANGE
- INTER STIFF.
- LONGIT. STIFF.

SEE STANDARD 24.7 FOR KINKED GIRDER DETAILS.

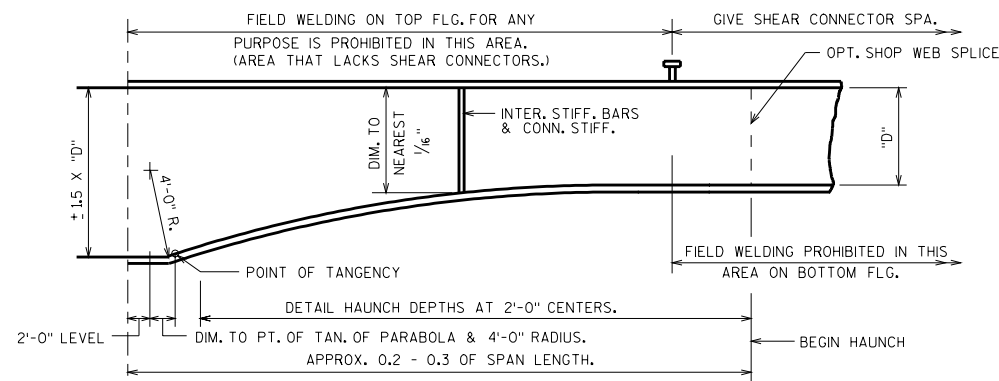


Diagram illustrating the edge of slab at median and slab overhang dimensions. The diagram shows a cross-section of a slab with a vertical edge on the left. A horizontal line indicates the 'EDGE OF SLAB AT MEDIAN'. The distance from this edge to the centerline of the slab is labeled 'SLAB OVERHANG'. The distance from the centerline to the edge of the slab is also labeled 'SLAB OVERHANG'.

CONN. STIFF.
INT. STIFF. &
BRG. STIFF.

MATERIAL THICKNESS OF THICKER PART JOINED.	† MIN. SIZE OF FILLET WELD
TO 1/2" INCLUSIVE	3/16"
OVER 1/2" TO 3/4"	1/4"
OVER 3/4" TO 1 1/2"	△ 3/8"
OVER 1 1/2" TO 2 1/4"	△ 3/8"
OVER 2 1/4" TO 6"	△ 1/2"

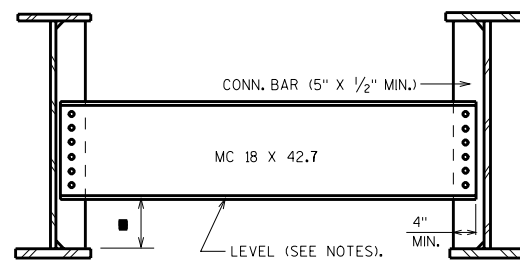
† EXCEPT THAT THE WELD SIZE SHALL NOT EXCEED THE THICKNESS OF THE THINNER PART JOINED.

△ MIN. PASS SIZE IS $\frac{5}{16}$ "

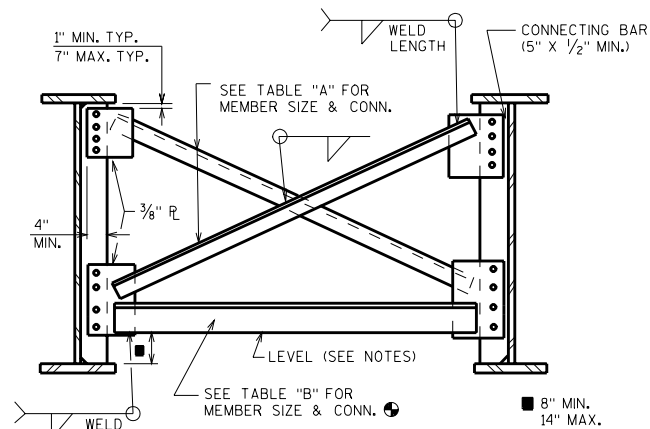
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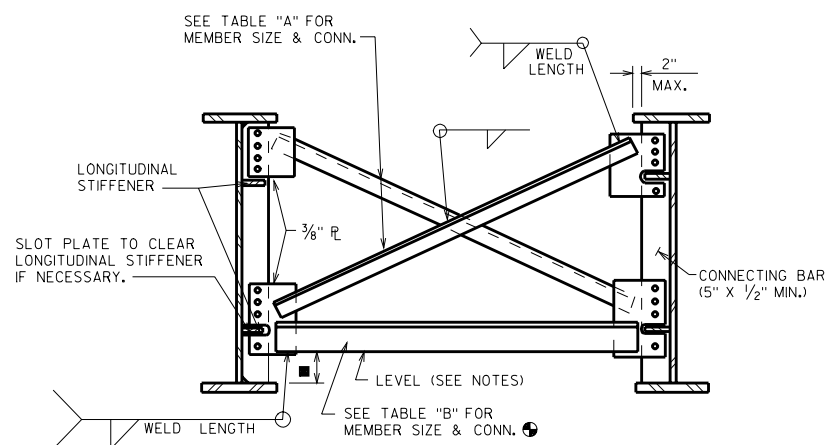
STANDARD	24.2
----------	------



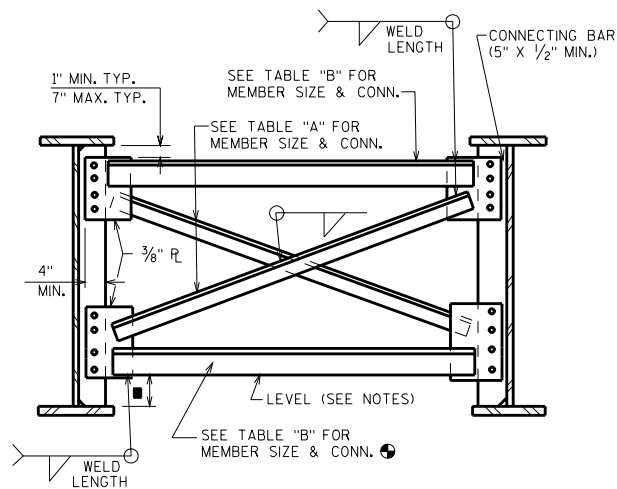
**WEB PLATE $\leq 48"$
TYP. IN SPAN & AT PIER**



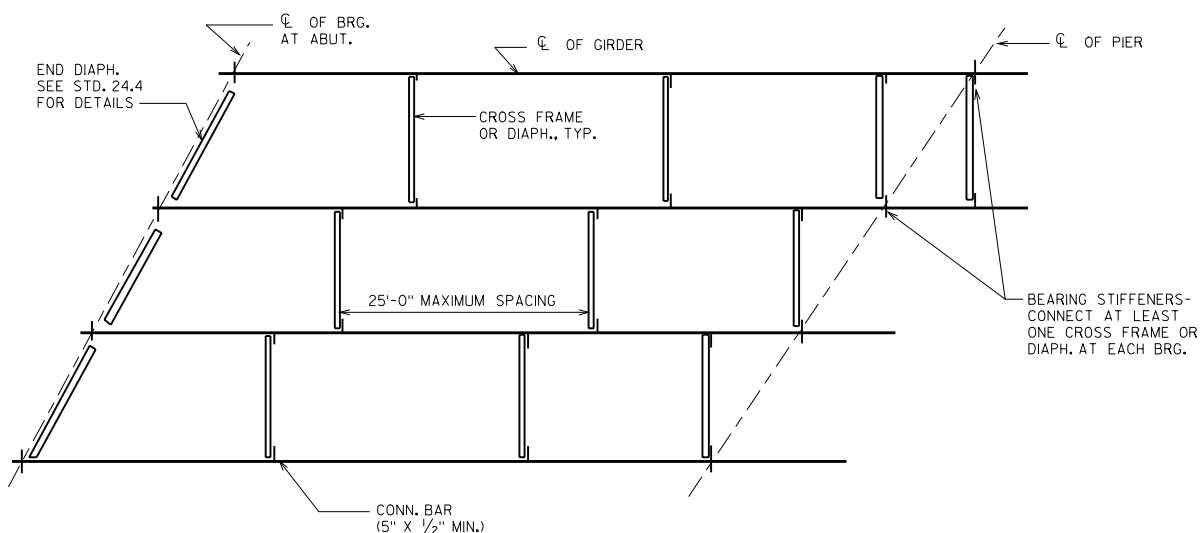
**WEB PLATE OVER 48"
TYP. IN SPAN & AT PIER**



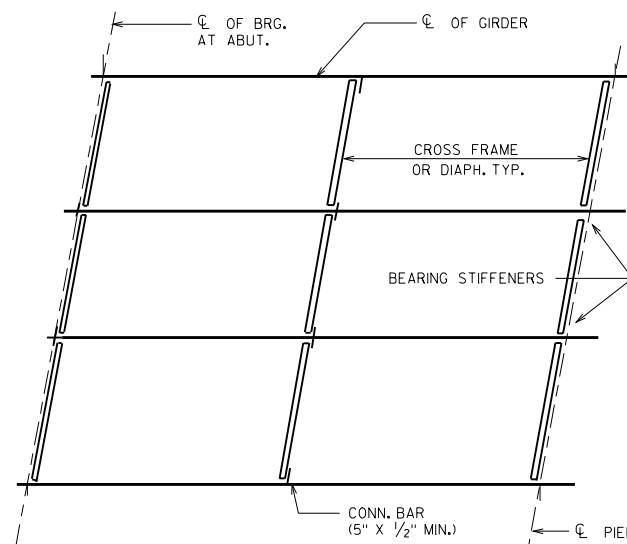
**WEB PLATE OVER 48" WITH LONGITUDINAL STIFFENERS
TYP. IN SPAN & AT PIER**



TYP. CURVED GIRDER DIAPHRAGM
ALSO USE TOP HORIZONTAL MEMBER AT DIAPHRAGMS
ADJACENT TO KINK POINTS OF KINKED GIRDERS



FRAMING PLAN FOR SKEW $> 15^\circ$



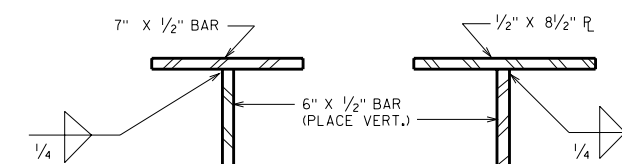
FRAMING PLAN FOR SKEW $\leq 15^\circ$

TABLE "A"

SIZE	MAX. LENGTH OF MEMBER	WELD LENGTH	NO. OF $\frac{3}{4}" \phi$ BOLTS	WEIGHT PER FT.
L $3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	21'-6"	9"	4	7.2#
L $4 \times 4 \times \frac{5}{16}$	25'-0"	11"	4	8.2#
L $5 \times 5 \times \frac{5}{16}$	31'-0"	14"	5	10.3#

TABLE "B"

SIZE	MAX. LENGTH OF MEMBER	WELD SIZE	WELD LENGTH	NO. OF $\frac{3}{4}" \phi$ BOLTS	WEIGHT PER FT.
L $5 \times 5 \times \frac{5}{16}$	11'-6"	$\frac{1}{4}"$	11"	4	10.3#
L $6 \times 6 \times \frac{3}{8}$	13'-6"	$\frac{5}{16}"$	13"	6	14.9#
$\frac{1}{2}"$ T SECTION SEE DETAIL "A"	17'-6"	$\frac{5}{16}"$	14"	7	16.6#
$\frac{1}{2}"$ T SECTION SEE DETAIL "B"	22'-0"	$\frac{3}{8}"$	13"	7	18.5#



DETAIL "A"

DETAIL "B"

NOTE: WT 6 X 25 MAY BE SUBSTITUTED FOR DETAIL "A" OR "B"

NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING $\frac{3}{4}" \phi$ HIGH STRENGTH BOLTS (A.S.T.M. A325) WITH DOUBLE WASHERS.

FOR SPANS OVER 200', THE CROSS FRAMES AT THE PIERS SHALL BE DESIGNED TO RESIST THE LATERAL LOADS THAT ARE TRANSFERRED TO THE PIERS.

DIAPHRAGMS OR LOWER CROSS FRAME MEMBERS ARE SLOPED WHEN DIFFERENCE IN ADJACENT BOTTOM FLANGE ELEVATIONS EXCEEDS 6". HOLD 8" FROM TOP OF ADJACENT FLANGES TO BOTTOM OF DIAPHRAGMS OR LOWER CROSS FRAME WHEN THESE MEMBERS ARE SLOPED.

DIAPHRAGMS OR LOWER CROSS FRAME MEMBERS THAT ARE LEVEL SHALL BE PLACED 8" ABOVE THE TOP OF THE HIGHER BOTTOM FLANGE OF ADJACENT GIRDERS.

HOLES IN CROSS FRAME CONNECTIONS MAY BE OVERSIZED $\phi \frac{1}{16}"$ DIA. IN 1 PLY.

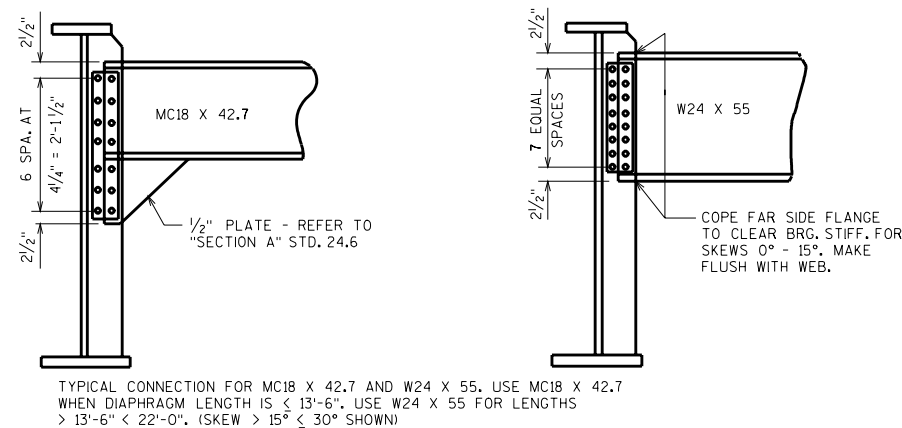
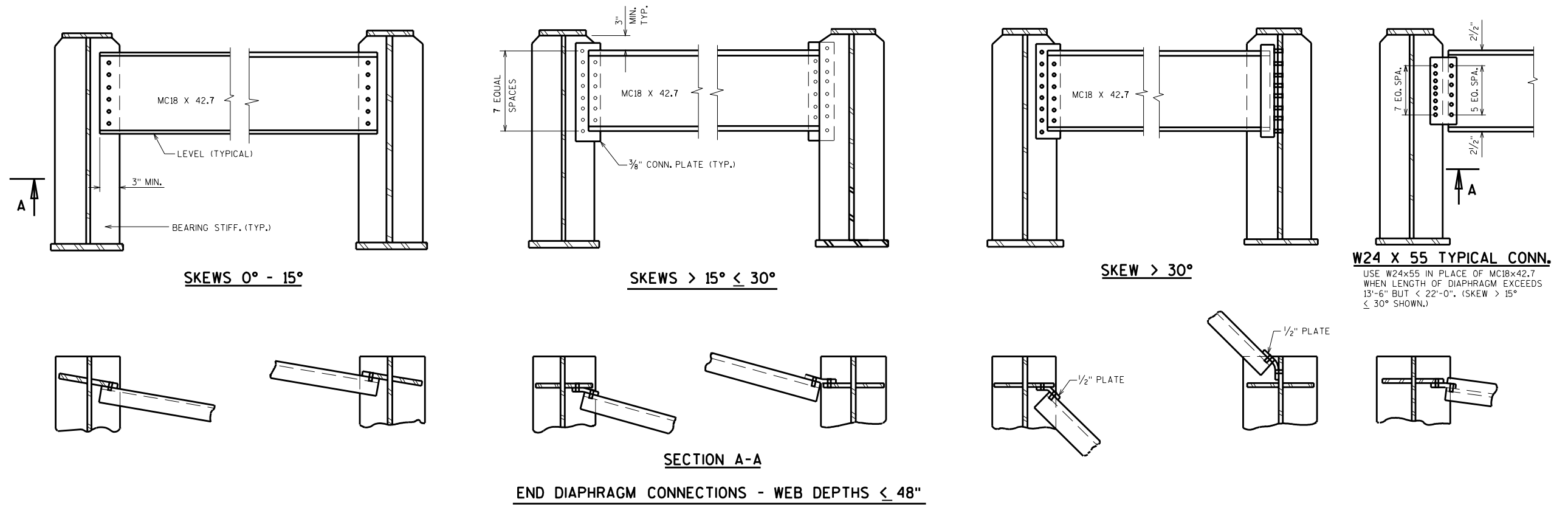
\bullet HORIZONTAL CROSSFRAME MEMBER TO HAVE HORIZONTAL LEG TOP (AS SHOWN) WHEN NO LOWER LATERALS ARE USED. WHEN LOWER LATERALS ARE USED THE HORIZONTAL LEG SHALL BE ON THE BOTTOM, THIS IS TO ALLOW FRAMING INTO THE LOWER LATERAL GUSSET.

PLATE GIRDER DIAPHRAGMS AND CROSS FRAMES

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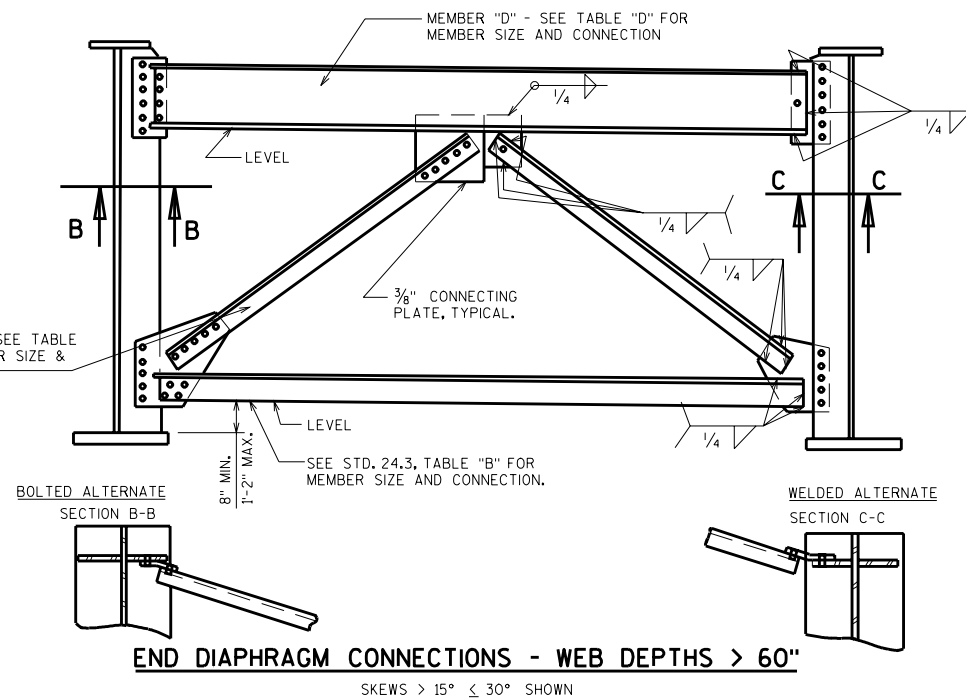


END DIAPHRAGM CONNECTIONS - WEB DEPTHS > 48" < 60"

TABLE "D"

MEMBER "C"	WEB DEPTH									MEMBER	MEMBER "D" CONN.	
	5'-0" - 6'-6"			6'-6" - 7'-6"			7'-6" - 8'-9"				NO. OF ¾" ϕ BOLTS	
MAXIMUM LENGTH	MEMBER "C" SIZE	NO. OF ¾" ϕ BOLTS	LENGTH OF ¼" WELD	MEMBER "C" SIZE	NO. OF ¾" ϕ BOLTS	LENGTH OF ¼" WELD	MEMBER "C" SIZE	NO. OF ¾" ϕ BOLTS	LENGTH OF ¼" WELD	"D" SIZE	CONN. PLATE TO BRG. STIFF.	MEMBER "D"
11'-6"	4 X 4 X 5/16	5	13	4 X 4 X 5/16	5	12	4 X 4 X 5/16	5	11	C12 X 20.7	6 @ 2 1/2"	4 @ 2 1/2"
13'-6"	5 X 5 X 5/16	6	17	5 X 5 X 5/16	6	16	5 X 5 X 5/16	6	15	C12 X 20.7	6 @ 2 1/2"	4 @ 2 1/2"
17'-6"	6 X 6 X 5/16	8	20	5 X 5 X 5/16	7	18	5 X 5 X 5/16	6	16	C15 X 33.9	7 @ 2 1/2"	5 @ 2 1/2"
22'-0"	6 X 6 X 5/16	9	23	6 X 6 X 5/16	8	21	6 X 6 X 5/16	7	19	MC18 X 42.7	7 @ 2 1/2"	6 @ 2 1/2"

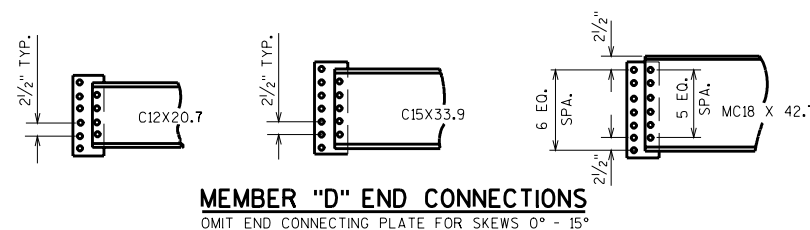
NOTE: ALL MEMBER "C" SIZES REPRESENT ANGLES.



NOTES

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE MADE WITH 3/4" Ø HIGH STRENGTH BOLTS. (A.S.T.M. A325)

FOR WEB DEPTHS GREATER THAN 60", THE NUMBER OF BOLTS REQUIRED BETWEEN BEARING STIFFENERS AND LOWER CONNECTING PLATES EQUALS THE NUMBER OF BOLTS REQUIRED IN MEMBER "C" OR THE NUMBER REQUIRED IN THE LOWER HORIZONTAL MEMBER, WHICHEVER IS GREATER.

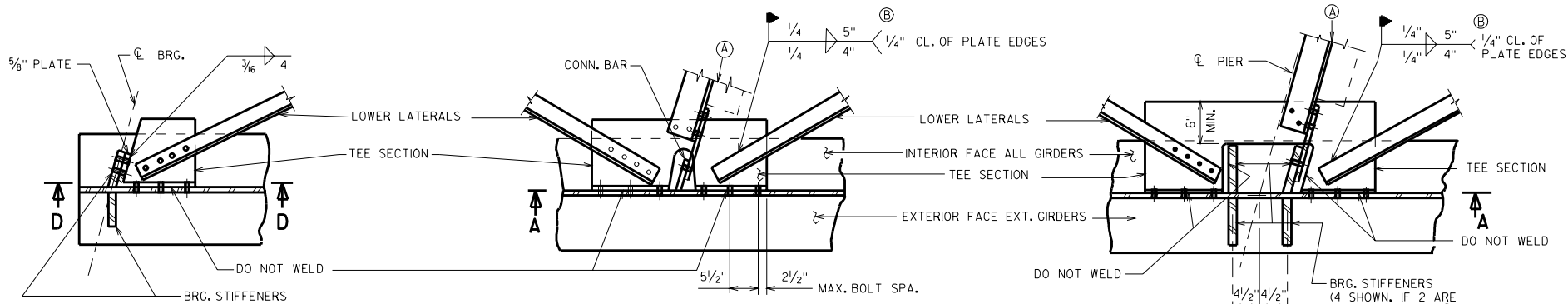


END DIAPHRAGMS

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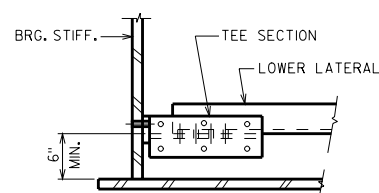
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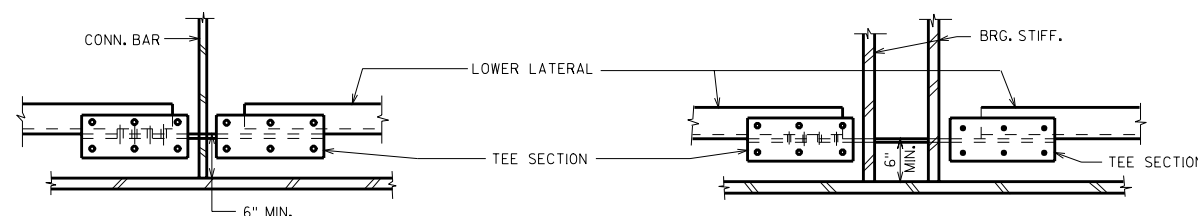
AT ABUTMENT

IN SPAN

AT PIER

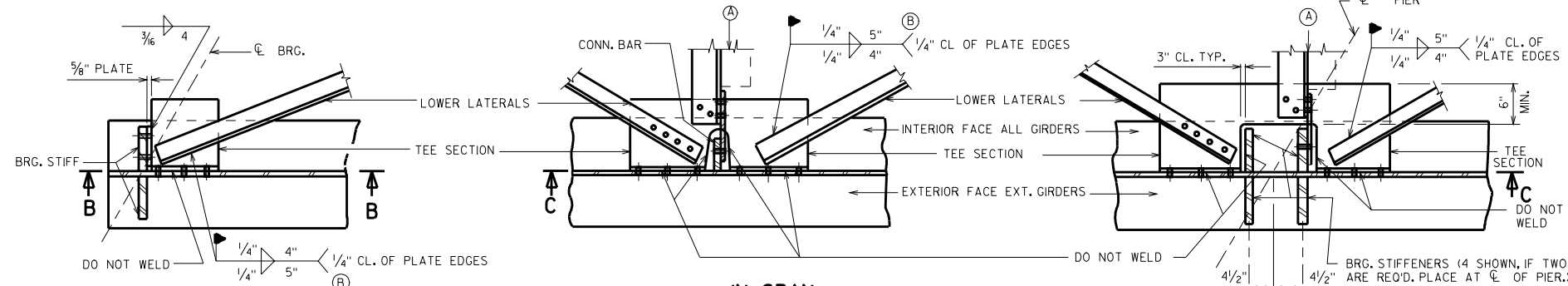


SECTION D



SECTION A & C

CONNECTION DETAILS FOR SKEWS $\leq 15^\circ$

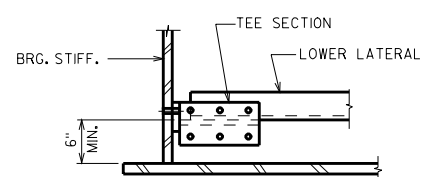


AT ABUTMENT

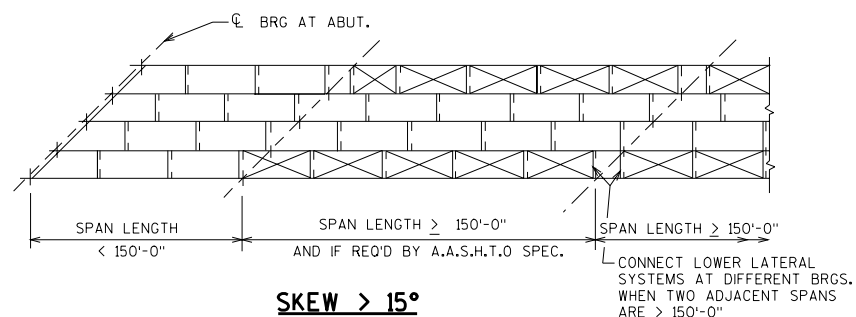
IN SPAN

AT PIER

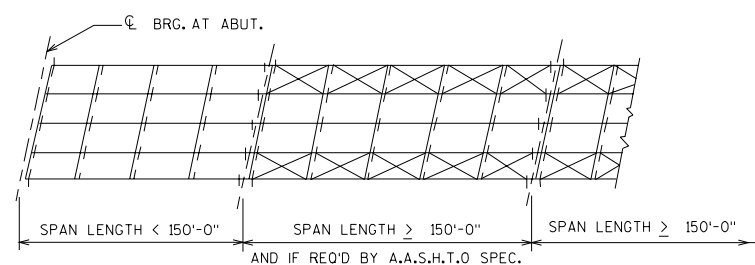
CONNECTION DETAILS FOR SKEWS $> 15^\circ$



SECTION B



SKEW $> 15^\circ$



SKEW $\leq 15^\circ$

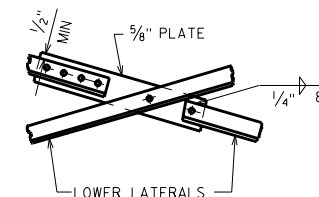
PLAN VIEW SHOWING LOWER LATERAL LOCATIONS

NOTES

Ⓐ ANGLE OR BUILT-UP SECTION FROM TABLE B, STANDARD 24.3. THE TEE SECTION FOR THE LOWER LATERAL CONNECTION MAY BE PLACED ABOVE THIS MEMBER WHEN THIS MEMBER IS SLOPED.

PLACE EACH PANEL OF LOWER LATERALS IN ONE PLANE. PANELS MUST BE HORIZONTAL IN THE TRANSVERSE DIRECTION ONLY.

LOWER LATERALS WHEN REQ'D IN SPANS OF 150'-0" OR GREATER, PLACE IN EXTERIOR BAYS.



USE L 4" X 3" X 5/16" WITH 10 1/2" LENGTH OF 1/4" WELD OR 4 - 3/4" ϕ HIGH STRENGTH FRICTION TYPE BOLTS FOR MAX. LOWER LATERAL LENGTH OF 26'-0". (PLACE 4" LEG VERT.) (WT. = 7.2 LBS./FT.)
USE L 5" X 3 1/2" X 5/16" WITH 12 1/2" LENGTH OF 1/4" WELD OR 4 - 3/4" ϕ HIGH STRENGTH FRICTION TYPE BOLTS FOR MAX. LOWER LATERAL LENGTH OF 30'-6" (PLACE 5" LEG VERT.) (WT. = 8.7 LBS./FT.)

LOWER LATERAL CONNECTION STEMS SHALL BE AS CLOSE TO THE BOTTOM GIRDER FLANGE (BUT NO CLOSER THAN 6" PLUS PLATE THICKNESS) AS FEASIBLE. THIS APPLIES TO BOTH HAUNCHED AND PARALLEL FLANGE GIRDERS.

ALL AREAS SUBJECT TO FIELD WELDS SHALL BE PROTECTED BY WELDABLE RUST PROOF COATINGS PRIOR TO WELDING.

LOWER LATERAL SHELFs TO BE PROVIDED BY TEE SECTION CUT FROM PREFERABLY WT 12 X 34 IN SPAN AND WT 15 X 49.5 AT PIERS, OR FABRICATE WITH EQUIVALENT PLATES.

IN REGARD TO LOWER LATERALS THE DESIGNER IS ADVISED TO CONSIDER CHANGES OF PLATE SIZES OR DIAPHRAGM SPACING TO OMIT LOWER LATERAL BRACING.

ALL BOLTED CONNECTIONS SHALL BE FRICTION TYPE USING 3/4" ϕ HIGH STRENGTH BOLTS (ASTM A325) WITH DOUBLE WASHERS. OVERSIZED HOLES 1/16" ϕ MAY BE USED IN LOWER LATERAL BRACING COMPONENTS IN 1 PLY.

Ⓑ FIELD WELDS ALLOWED ONLY ON UNPAINTED STEEL AT DESIGNATED STREAM CROSSINGS.

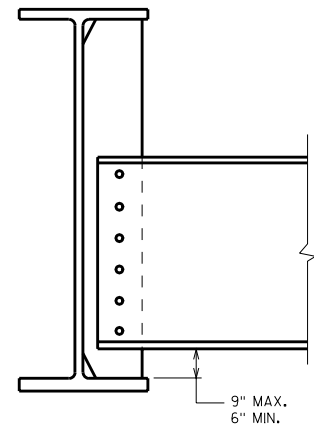
Ⓒ PREFERABLY SINGLE BEARING STIFFENER PAIRS SHALL BE USED AT PIERS.

LOWER LATERAL DETAILS

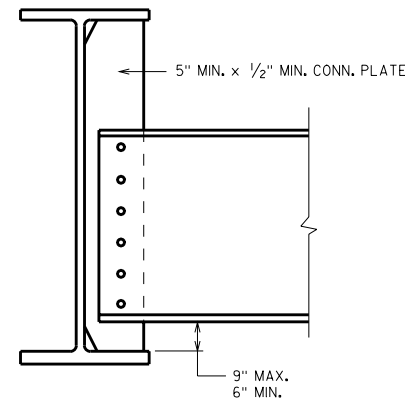
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99



36" W. GIRDER



33" W. GIRDER

INTERMEDIATE DIAPHRAGM SIZES

ALL INTERMEDIATE CONNECTIONS	
GIRDER DEPTH	INTERMEDIATE DIAPHRAGMS
36"	MC18 X 42.7
33"	MC18 X 42.7
30"	C15 X 33.9
27"	C15 X 33.9
24"	C12 X 20.7
21"	C10 X 15.3
18"	C8 X 11.5

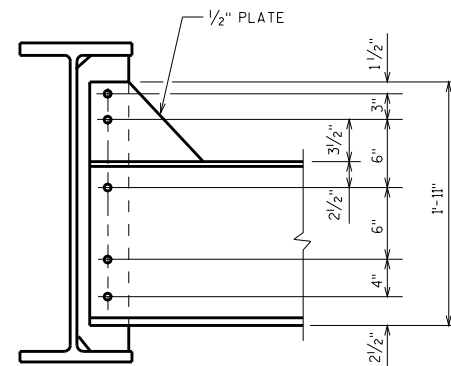
NOTES

DIAPHRAGMS SHALL BE HORIZONTAL EXCEPT WHEN THE DIFFERENCE IN ADJACENT GIRDER ELEVATIONS IS OF A MAGNITUDE THAT NECESSITATES SLOPING THE DIAPHRAGMS.

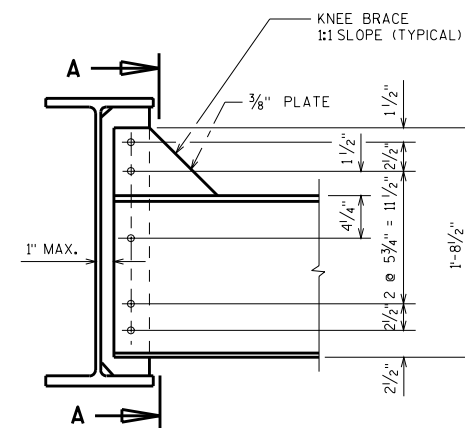
WHEN DIAPHRAGMS ARE SLOPED, PLACE CENTER OF DIAPHRAGM AT MID-DEPTH OF GIRDER.

ALL BOLTED CONNECTIONS SHALL BE MADE WITH $\frac{3}{4}$ " ϕ HIGH STRENGTH BOLTS. (A.S.T.M. A325)

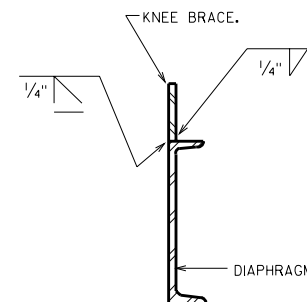
FOR CONNECTION BAR CORNER CLIPS & WELD DETAILS SEE "CONNECTION STIFFENER DETAILS" ON STD. 24.2



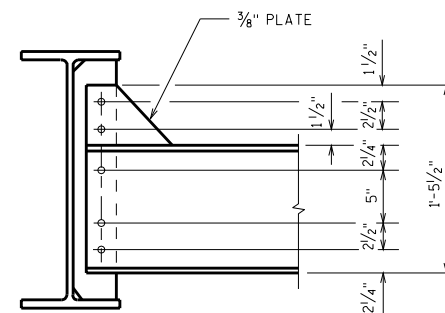
30" W. GIRDER



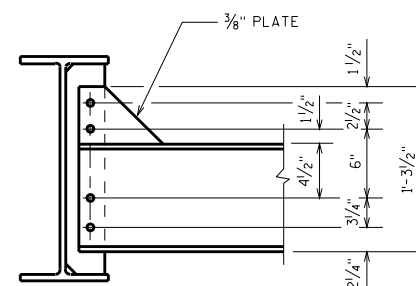
27" W. GIRDER



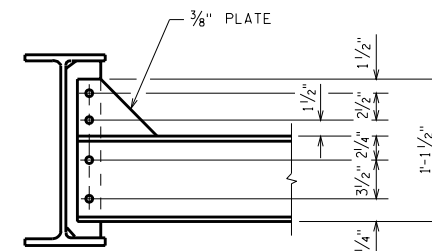
SECTION A



24" W. GIRDER



21" W. GIRDER



18" W. GIRDER

ROLLED GIRDER DIAPHRAGMS

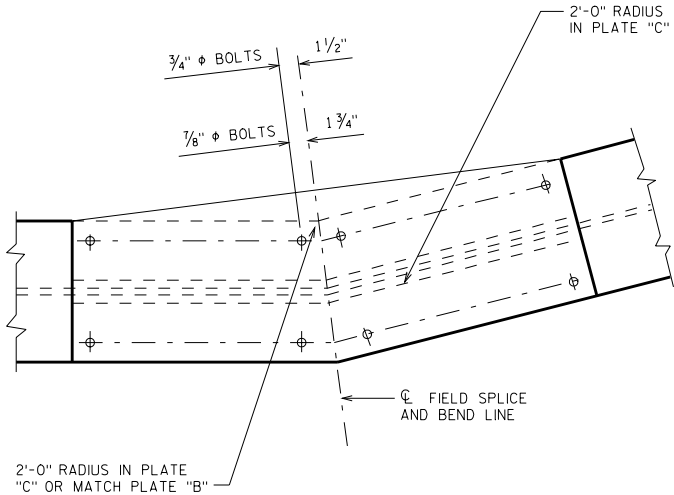
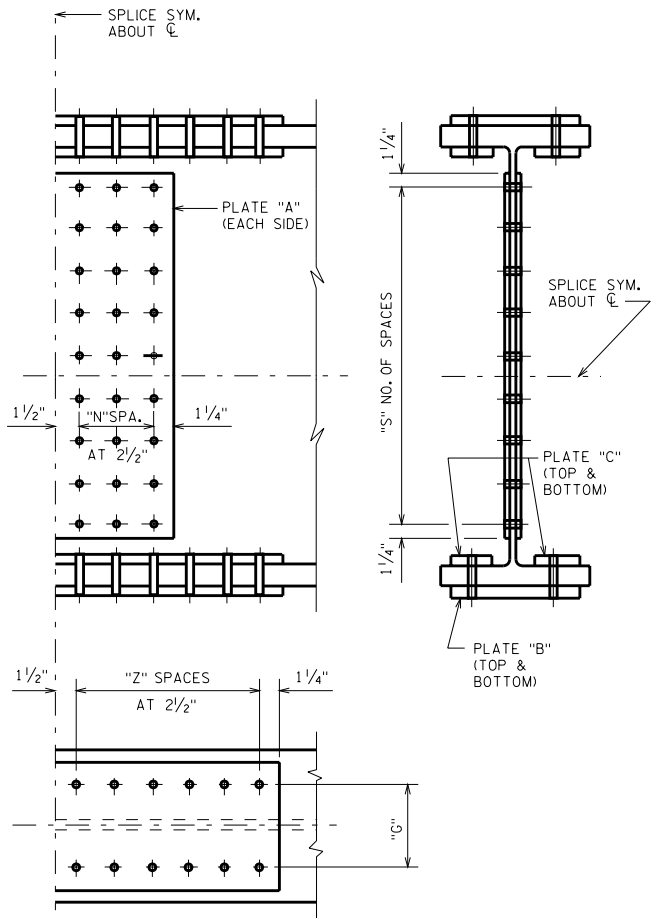
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 6/02

GIRDERS OF A709 GRADE 36 STEEL

GIRDERS OF A709 GRADE 50/A709 GRADE 50W STEEL

SECTION		WEB SPLICE			FLANGE SPLICE				MOMENT CAPACITY OF SPLICE FT. KIPS.	WEIGHT OF SPLICE LBS.	WEB SPLICE			FLANGE SPLICE				MOMENT CAPACITY OF SPLICE FT. KIPS.	WEIGHT OF SPLICE LBS.
		"N"	"S"	PLATE "A"	"Z"	"G"	PLATE "B"	PLATE "C"			"N"	"S"	PLATE "A"	"Z"	"G"	PLATE "B"	PLATE "C"		
W 24	68	1	6	10½ X ⅜	3	5	8 X ⅜ X 1-8½	3 X ⅜ X 1-8½	180	122	2	6	15½ X ⅜	4	5	8½ X ⅞ X 2-1½	3½ X ½ X 2-1½	270	193
	76	1	6	10½ X ⅜	3	5	8 X ⅜ X 1-8½	3 X ½ X 1-8½	205	131	2	6	15½ X ⅜	4	5	8½ X ⅞ X 2-1½	3½ X ⅞ X 2-1½	270	199
	84	1	7	10½ X ⅜	4	5½	9 X ⅜ X 2-1½"	3½ X ⅞ X 2-1½	225	158	2	6	15½ X ⅜	5	5	8½ X ½ X 2-6½	3½ X ½ X 2-6½	280	225
W 27	84	1	8	10½ X ⅜	4	5½	9 X ⅜ X 2-1½"	3½ X ⅜ X 2-1½"	245	159	2	7	15½ X ⅜	5	5	8½ X ½ X 2-6½	3½ X ⅞ X 2-6½	330	245
	94	2	5	15½ X ⅜	4	5½	9 X ⅜ X 2-1½"	3½ X ⅞ X 2-1½	285	203	2	8	15½ X ⅜	6	5½	9 X ⅞ X 2-11½	3½ X ⅞ X 2-11½	380	297
W 30	99	2	7	15½ X ⅜	4	5½	9 X ⅜ X 2-1½"	3½ X ½ X 2-1½	320	209	2	9	15½ X ⅞	6	6	9½ X ½ X 2-11½	3½ X ⅞ X 2-11½	430	316
	108	2	7	15½ X ⅜	5	5½	9 X ⅞ X 2-6½	3½ X ½ X 2-6½	349	241	3	7	20½ X ⅞	6	6½	10 X ½ X 2-11½	3½ X ¾ X 2-11½	480	371
	116	2	7	15½ X ⅜	5	6	9½ X ⅞ X 2-6½	3½ X ⅝ X 2-6½	385	259	3	7	20½ X ⅞	7	6½	10 X ⅞ X 3-4½	3½ X ¾ X 3-4½	510	417
	124	2	7	15½ X ⅜	5	6½	10 X ⅞ X 2-6½	3½ X ¾ X 2-6½	425	279	3	7	20½ X ⅞	7	6	10 X ⅞ X 3-4½	4 X ¾ X 3-4½	550	433
	132	2	8	15½ X ⅜	6	6½	10 X ½ X 2-11½	3½ X ¾ X 2-11½	450	323	3	8	20½ X ⅞	8	6	10 X ⅝ X 3-9½	4 X ¾ X 3-9½	580	488
W 33	118	2	8	15½ X ⅜	5	6	10 X ⅞ X 2-6½	4 X ½ X 2-6½	440	269	3	8	20½ X ⅞	7	7	11 X ½ X 3-4½	4 X ⅝ X 3-4½	570	426
	130	2	8	15½ X ⅜	5	6	10 X ⅞ X 2-6½	4 X ⅝ X 2-6½	480	286	3	8	20½ X ⅞	8	7	11 X ⅝ X 3-9½	4 X ⅝ X 3-9½	640	494
	141	2	8	15½ X ⅜	6	7	11 X ⅞ X 2-11½	4 X ⅝ X 2-11½	515	324	3	9	20½ X ⅞	9	6½	11 X ⅝ X 4-2½	4½ X ¾ X 4-2½	715	583
	152	2	9	15½ X ⅜	7	7	11 X ½ X 3-4½	4 X ¾ X 3-4½	580	393	3	9	20½ X ⅞	10	6½	11 X ⅝ X 4-7½	4½ X ⅞ X 4-7½	765	659
W 36	135	2	9	15½ X ⅜	6	7	11 X ⅞ X 2-11½	4 X ½ X 2-11½	530	314	3	10	20½ X ⅞	8	6½	11 X ⅞ X 3-9½	4½ X ⅝ X 3-9½	715	509
	150	2	10	15½ X ⅜	7	7	11 X ½ X 3-4½	4 X ⅝ X 3-4½	600	381	3	10	20½ X ⅞	9	6½	11 X ⅝ X 4-2½	4½ X ¾ X 4-2½	805	598
	160	2	10	15½ X ⅜	7	7	11 X ½ X 3-4½	4 X ¾ X 3-4½	645	404	3	11	20½ X ½	10	6½	11 X ⅝ X 4-7½	4½ X ⅞ X 4-7½	855	676
	170	2	11	15½ X ⅜	8	7	11 X ⅞ X 3-9½	4 X ¾ X 3-9½	690	458	3	11	20½ X ⅞	11	6½	11 X ¾ X 5-0½	4½ X ⅞ X 5-0½	930	768



SPLICE DETAIL FOR KINKED GIRDERS

DESIGN CRITERIA

THE SPLICE IS DESIGNED WITH A CAPACITY OF 80% OF THE STRENGTH OF THE NET SECTION OF THE SMALLER MEMBER BEING JOINED. CHECK MOMENT CAPACITY OF SPLICE WITH EXISTING CONDITIONS.

THE NET SECTION IS TAKEN THRU THE GIRDER WHERE ONLY THE FLANGE CONNECTORS OCCUR. THE SHEAR CAPACITY IS BASED ON THE "T" DEPTH AS GIVEN IN THE A.I.S.C. HANDBOOK.

ALL SPLICE DESIGNS ARE BASED ON 3/4" ϕ HIGH STRENGTH BOLTS IN A CONNECTION.

ALL SPLICE PLATES ARE MADE OF STEEL CONFORMING TO A.S.T.M. SPECIFICATIONS FOR A709 GRADE 36.

THE ALLOWABLE STRESSES USED IN THE DESIGN ASSUMING NO ALTERNATING STRESSES (A.A.S.H.T.O. LOADING COND. NO. 1) ARE:

	A709 GRADE 36	A709 GRADE 50/A709 GRADE 50W
BENDING:	20,000 p.s.i.	27,000 p.s.i.
SHEAR:	12,000 p.s.i.	17,000 p.s.i.

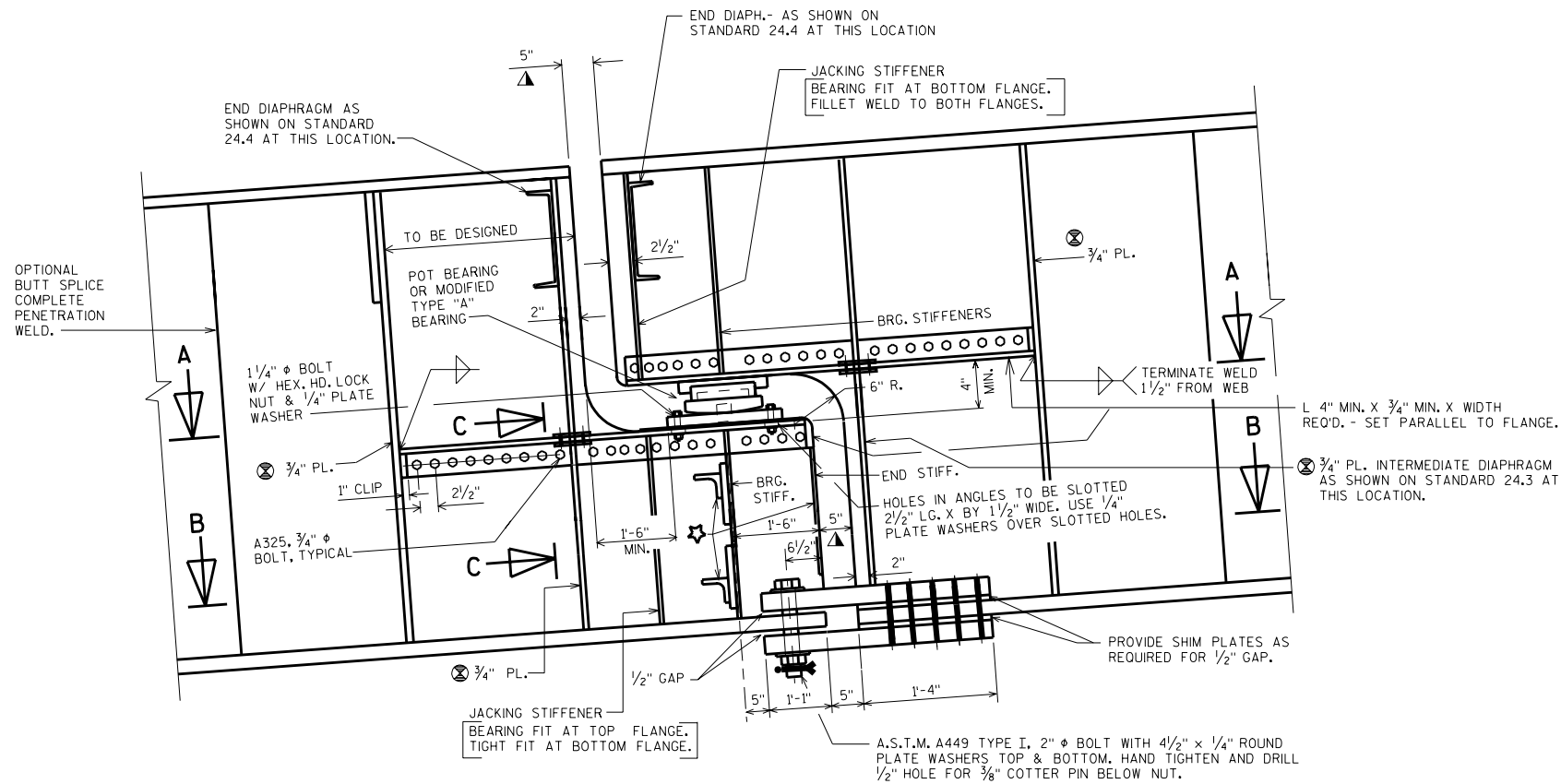
THESE STRESSES ARE APPLIED TO ALL SECTIONS REGARDLESS OF THICKNESS

ROLLED GIRDER SPLICE DETAILS

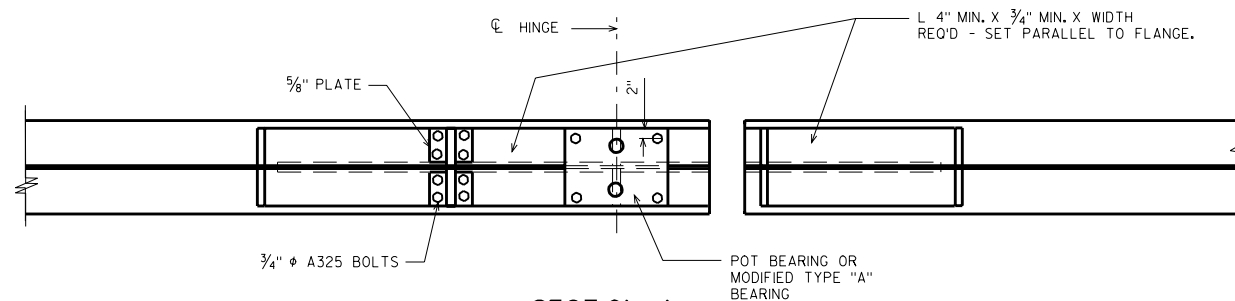
STATE OF WISCONSIN
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STRUCTURES DEVELOPMENT SECTION

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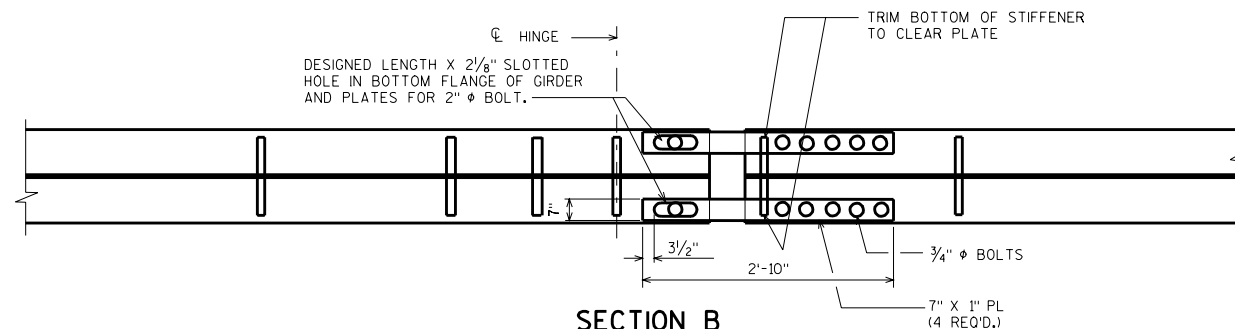
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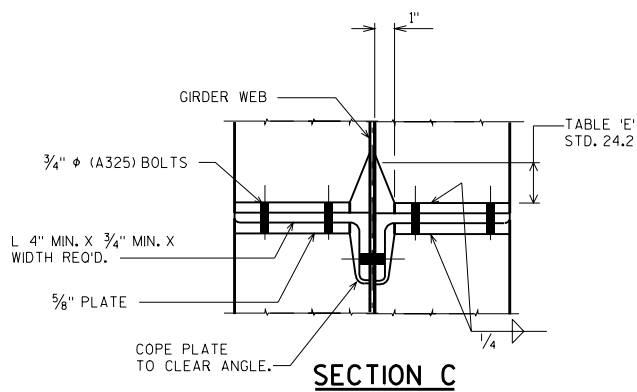
ELEVATION



SECTION A



SECTION B



SECTION C

NOTES

- ⊗ FOR WELDING DETAILS SEE "CONNECTION STIFFENER DETAILS" ON STANDARD 24.2 MINIMUM PLATE SIZE SHOWN. DESIGN ACTUAL SIZE REQUIRED.

STIFFENERS AND BEARING PLATES ARE ALL PERPENDICULAR TO FLANGES. ANGLES ARE PARALLEL TO FLANGES.

DESIGNER NOTES

SIZE AND LENGTH OF ANGLES, NUMBER OF BOLTS THRU ANGLES, THICKNESS OF WEB PLATE, AND SIZE OF BEARING STIFFENERS AND JACKING STIFFENERS SHALL BE DETERMINED FROM AN ANALYSIS USING THE VERTICAL AND HORIZONTAL FORCES ACTING AT THE HINGE.

- ▲ THE 5" OPENING BETWEEN GIRDER WEB AND FLANGE PLATES IS FOR FABRICATION ACTUAL OPENING IS BASED ON EXPANSION LENGTH AND TEMPERATURE.

SLOTTED HOLES OF 6" IN THE FLANGES AND CONNECTING BARS WILL ACCOMMODATE A TOTAL TEMPERATURE MOVEMENT OF 8" (\pm 4" FROM 45° F). THE DESIGNER MAY NEED TO INCREASE OR DECREASE THE LENGTH OF THE SLOT TO MEET SPECIFIC JOB REQUIREMENTS.

- ☆ CROSS FRAME UNDER BRG. AND END STIFFENER IS ONLY REQ'D. IF TOTAL WEB HEIGHT EXCEEDS 8'-0".

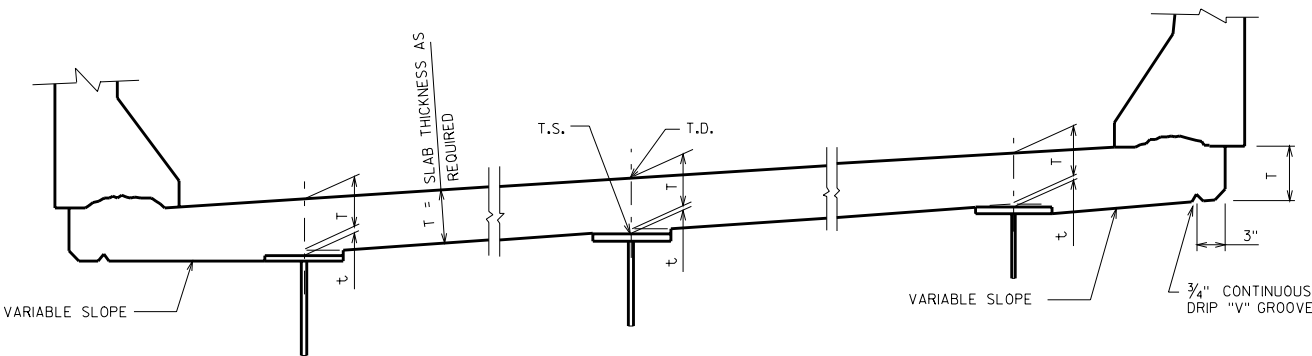
SEE BRIDGE MANUAL, SECTION 24.1 FOR CRITERIA FOR LOCATING HINGE JOINTS.

EXPANSION HINGE JOINT DETAILS

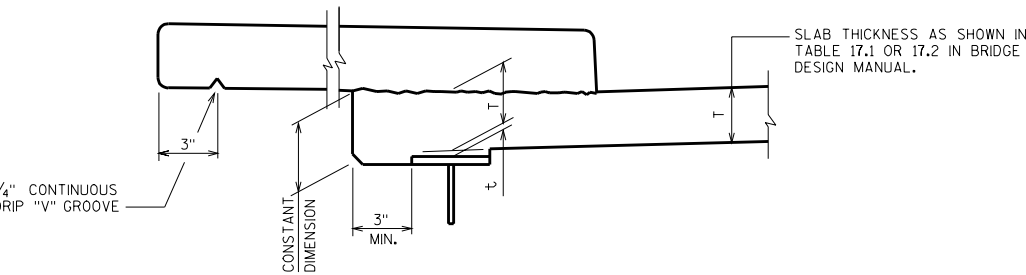
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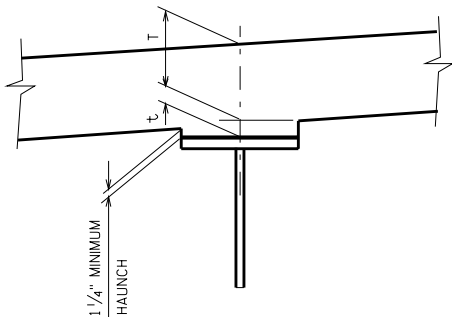
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1/99



SECTION THRU SLAB



TREATMENT OF EXTERIOR GIRDER
AT SIDEWALK OVERHANG



HAUNCH DETAIL

NOTES

t = HAUNCH HEIGHT AT CENTERLINE OF GIRDER.
HAUNCH HEIGHTS WILL NORMALLY BE MADE 1 1/4" AT ABUTMENTS,
HINGES, AND FIELD SPLICES.

HAUNCH DEPTH VARIATIONS NEED NOT BE SHOWN ON THE PLANS.

(TO DETERMINE "t": AFTER ALL STRUCTURAL STEEL HAS BEEN ERECTED,
ELEVATIONS OF THE TOP FLANGES, TOP OF SPLICE PLATES, OR TOP OF
COVER PLATES, WHICHEVER APPLIES, SHALL BE TAKEN AT CENTERLINE OF
BEARINGS, CENTERLINE OF FIELD SPLICES, AND AT QUARTER POINTS AND
FOR SPANS OVER 100' LONG INCLUDE ELEVATIONS AT 1/8' POINTS OF
EACH SPAN WHICH ARE MORE THAN 6' FROM A FIELD SPLICE.)

TOP OF DECK ELEV. AT FINAL GRADE.

- TOP OF STEEL ELEV. AFTER PLACEMENT.

+ CONC. ONLY DEFLECTION; DOWNWARD DEFLECTION IS ADDED, UPWARD DEFLECTION IS SUBTRACTED.

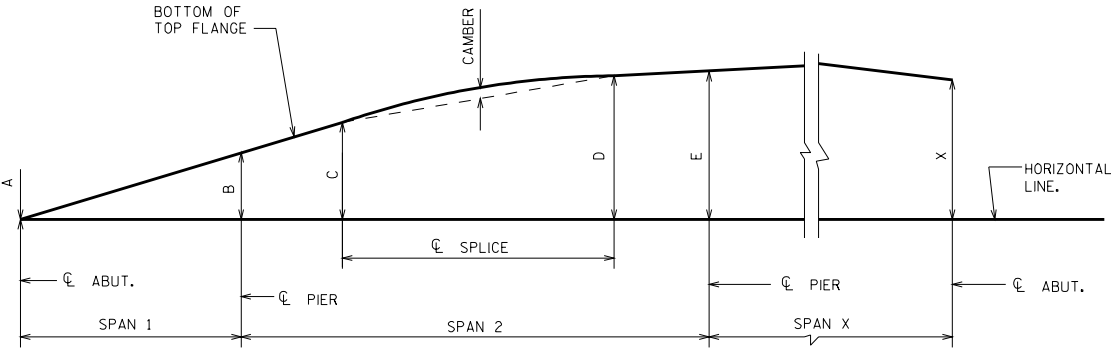
- SLAB THICKNESS ('T')

= "t" VALUE FOR SETTING HAUNCH.

ELEVATIONS AT TOP OF DECK (T.D.) & TOP OF STEEL (T.S.)

		W. ABUT.	1/4 SPAN	1/2 SPAN	3/4 SPAN	CL PIER	CL SPLICE		CL ABUT.
GIRDER 1	T.D.	861.17	861.13	861.08	861.04	860.99	860.95		860.69
	T.S.	860.48				860.35	860.35		860.00
GIRDER 2	T.D.	860.62	860.58	860.53	860.49	860.45	860.40		860.16
	T.S.	859.93				859.80	859.80		859.59
GIRDER X	T.D.								
	T.S.								

THESE ELEVATIONS ARE TO TOP OF STEEL (SPLICE AND COVER PLATE
THICKNESS, IF APPLICABLE, ARE ACCOUNTED FOR) AND THEY ARE FOR
THE MATERIAL AS ERECTED. THE ELEVATION OF THE TOP STEEL AT THE
FIELD SPLICE POINTS SHALL BE CHECKED, AND CORRECTED, IF POSSIBLE,
AFTER ERECTION AND BEFORE PERMANENTLY BOLTING THE DIAPHRAGMS
IN PLACE.



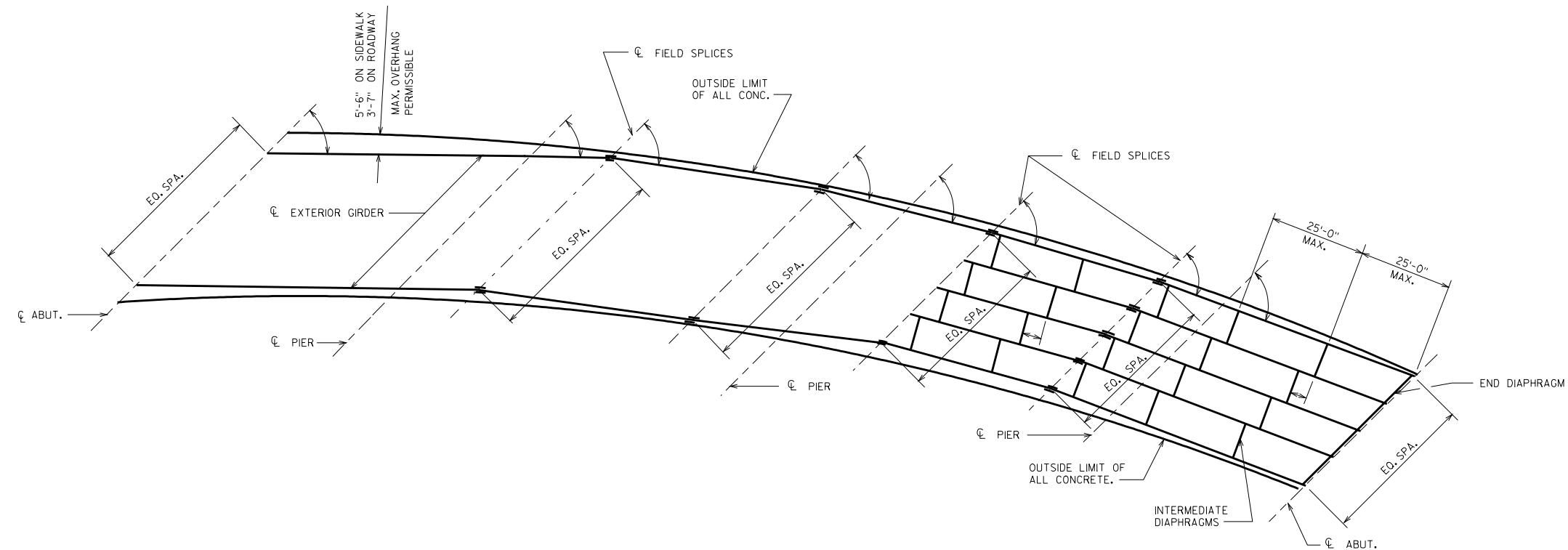
BLOCKING DIAGRAM

BLOCKING & SLAB
HAUNCH DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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GENERAL NOTES

FOUR SPAN STRUCTURE SHOWN BUT SKETCH AND NOTES APPLY TO ANY NUMBER OF SPANS.

IF POSSIBLE, HOLD CL SUBSTRUCTURE UNITS AND CL SPLICES PARALLEL TO EACH OTHER.

GIRDERS ARE TO BE HELD PARALLEL TO EACH OTHER, WITHIN EACH GIRDER LENGTH, FOR AS MANY SPANS AS THE OVERHANG WILL PERMIT. WHEN OVERHANG IS EXCEEDED, THE GIRDER SPACING SHALL BE CHANGED IN ONE GIRDER LENGTH, AFTER WHICH THE GIRDERS SHALL AGAIN BE HELD PARALLEL TO EACH OTHER FOR AS LONG AS THE OVERHANG PERMITS.

FOR HORIZONTAL CURVES EQUAL TO OR GREATER THAN 7° THE GIRDERS SHALL BE FABRICATED ALONG THE CURVE.

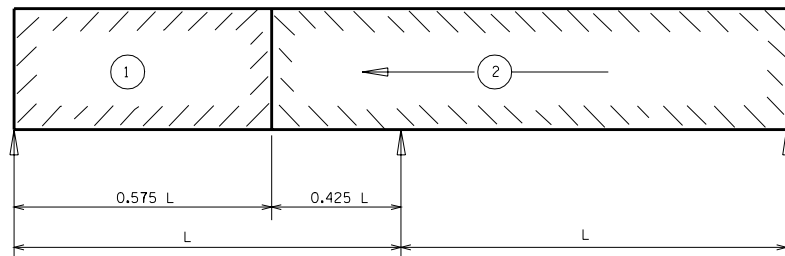
NUMBER AND SIZE OF GIRDERS AND LOCATION OF FIELD SPLICES TO BE DETERMINED BY DESIGN.

GIRDER LAYOUT ON CURVE

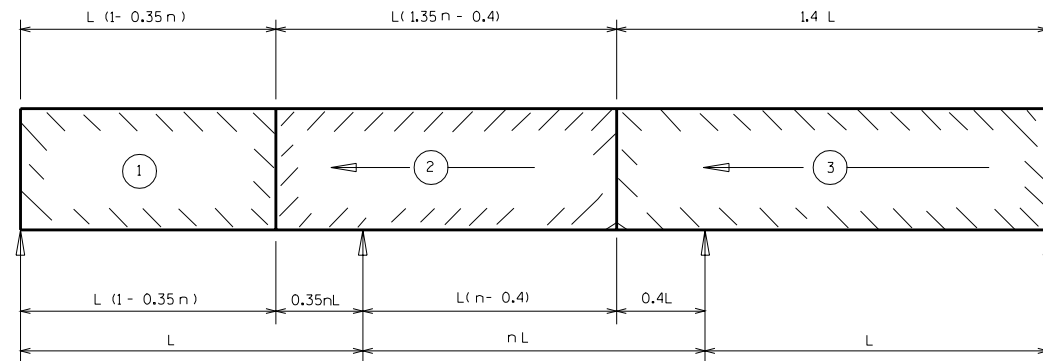
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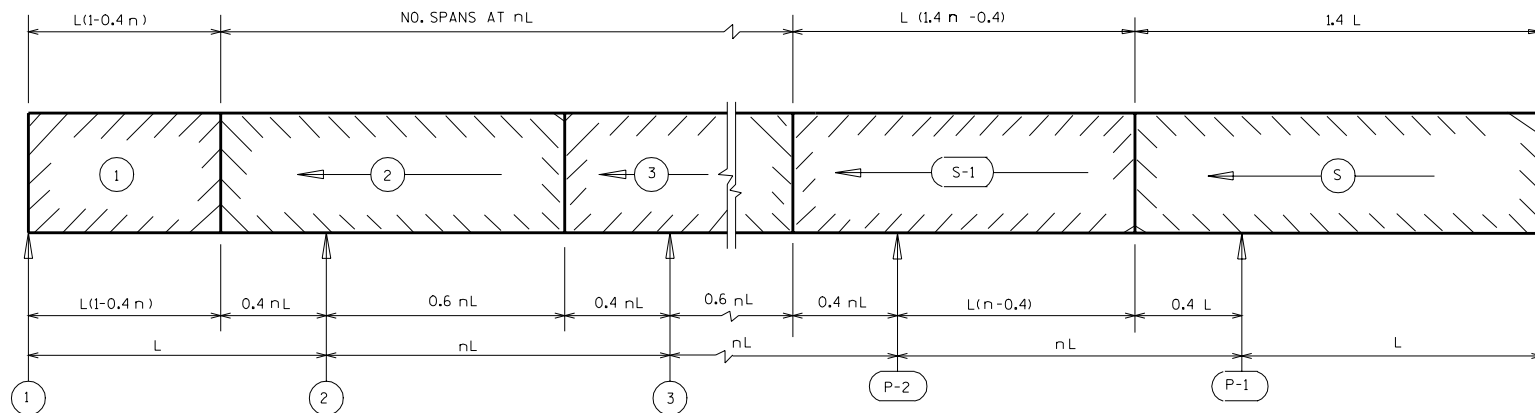
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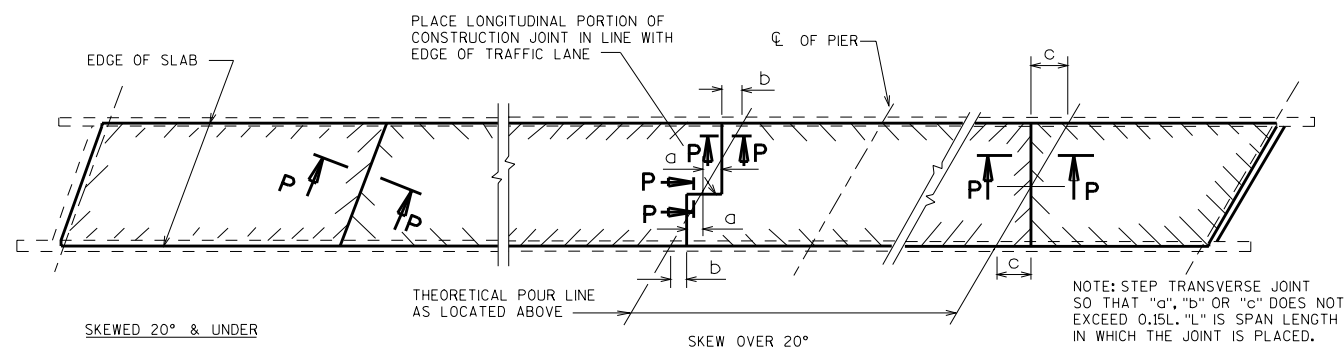
IDEAL POURS - 2 SPANS



IDEAL POURS - 3 SPANS



IDEAL POURS - ANY NUMBER OF SPANS



PLAN VIEW - SHOWING PLACEMENT OF TRANSVERSE CONSTRUCTION JOINTS

← 2 → INDICATES POUR NUMBER AND DIRECTION OF POUR

S = TOTAL NUMBER OF SPANS

P = TOTAL NUMBER OF SUPPORTS.

L = LENGTH OF EXTERIOR SPAN.

n = RATIO = $\frac{\text{INTERIOR SPAN}}{\text{EXTERIOR SPAN}}$

NOTES ON PLANS

THE RATE OF PLACING CONCRETE SHALL EQUAL OR EXCEED $\frac{1}{2}$ SPAN LENGTH PER HOUR BUT NEED NOT EXCEED 100 CU. YDS. PER HOUR. (REQUIRED ONLY FOR CONTINUOUS STEEL GIRDERS.)

TRANSVERSE CONSTRUCTION JOINTS, EXCEPT THOSE ADJACENT TO IN SPAN HINGES, MAY BE OMITTED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

TWO OR MORE ALTERNATE POURS MAY BE PLACED ON THE SAME DAY. (REQUIRED ONLY WHEN A POURING SEQUENCE IS SHOWN ON PLANS.)

THE CONTRACTOR MAY SUBMIT AN ALTERNATE POURING SEQUENCE SUBJECT TO THE APPROVAL OF THE STRUCTURES DESIGN SECTION. (REQUIRED ONLY WHEN A POURING SEQUENCE IS SHOWN ON THE PLANS.)

DESIGN NOTES

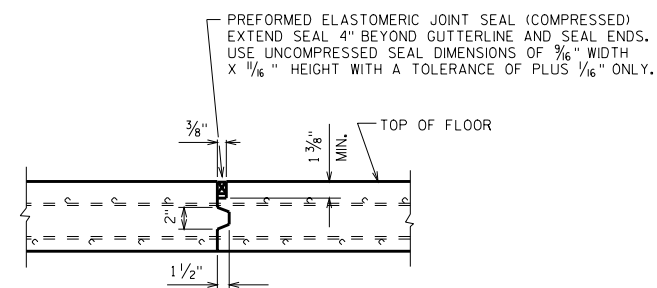
A SLAB POURING SEQUENCE AS SHOWN ON THIS SHEET IS NOT TO BE USED UNLESS REQUESTED BY THE STRUCTURES DEVELOPMENT SECTION.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE DETAILED ON PLANS TO LIMIT THE VOLUME OF POUR TO < 600 CU. YDS. IN URBAN AREAS AND < 300 CU. YDS. IN OTHER AREAS. GENERALLY FOR STEEL GIRDER SUPERSTRUCTURES LOCATE THE TRANSVERSE JOINTS AT THE 0.6 POINT (CONCRETE IN 60% OF SPAN) AND FOR PRESTRESS GIRDER SUPERSTRUCTURES LOCATE JOINTS NEAR THE 0.75 POINT. (CONCRETE IN 75% OF SPAN) CONSIDER CUT-OFF POINTS OF CONTINUITY REINFORCING STEEL WHEN LOCATING JOINTS. FOR PRESTRESS GIRDER SUPERSTRUCTURES, LOCATION OF JOINTS IN STEEL GIRDER SUPERSTRUCTURES MAY VARY IF DEFLECTIONS ARE INFLUENCED BY IN SPAN HINGES OR UNUSUAL SPAN LENGTH RATIOS. CHECK WITH THE STRUCTURES DEVELOPMENT SECTION FOR ADDITIONAL INFORMATION.

DETAIL TRANSVERSE CONSTRUCTION JOINTS 5'-0" FROM \bar{C} OF IN SPAN HINGES. (ONE ON EACH SIDE OF HINGE) THE CONCRETE BETWEEN THESE JOINTS SHOULD BE THE LAST POUR PLACED.

WHEN THE WIDTH OF SLAB IS GREATER THAN 90 FEET, A LONGITUDINAL CONSTRUCTION JOINT SHALL BE DETAILED. LOCATE LONGITUDINAL CONSTRUCTION JOINT ALONG EDGE OF LANE LINE AND AT LEAST 6 INCHES FROM EDGE OF TOP FLANGE OF GIRDER.

FOR GRADES OVER 3% THE PREFERRED DIRECTION OF POUR IS UPHILL.



SECTION P

SLAB POURING SEQUENCE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99

● PROVIDE SHEAR CONNECTORS ONLY AT EXTERIOR GIRDERS IF NOT REQUIRED FOR DESIGN.

FIELD WELD AT ALL GIRDERS. ●

TRANSVERSE BOTTOM SLAB BAR REINFORCEMENT FIELD WELDED AT 10'-0" ± SPACING IN ALL SPANS. IN LIEU OF USING TRANSVERSE BOTTOM REINFORCING BARS, ADDITIONAL EPOXY-COATED BARS MAY BE FURNISHED.

4" x 4" TEMPORARY TIMBER STRUTS @ 10 FT. SPACING IN EXTERIOR BAYS OF ALL SPANS.

EXTERIOR GIRDER

INTERIOR GIRDER

CROSS SECT. THRU RDWY.

(STEEL GIRDERS WITH WEB DEPTH ≤ 48")

FIELD WELD AT ALL GIRDERS, THEN COVER ANY UNCOATED AREAS OF REINF. WITH EPOXY-COATING MATERIAL.

TRANSVERSE BOTTOM SLAB BAR REINFORCEMENT FIELD WELDED AT 10'-0" ± SPACING IN ALL SPANS. IN LIEU OF USING TRANSVERSE BOTTOM REINFORCING BARS, ADDITIONAL EPOXY-COATED BARS MAY BE FURNISHED.

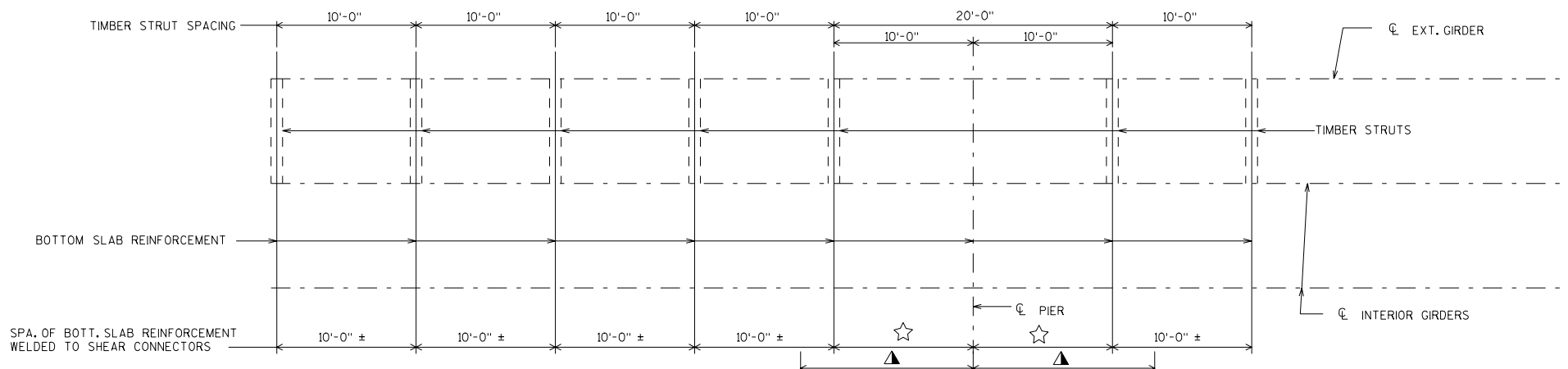
4" x 4" TEMPORARY TIMBER STRUTS @ 10 FT. SPACING IN EXTERIOR BAYS OF ALL SPANS.

EXTERIOR GIRDER

INTERIOR GIRDER

CROSS SECT. THRU RDWY.

(28" & 36" PRESTRESSED GIRDERS)



NOTE: THIS DETAIL SHALL BE CONSIDERED IF THE DISTANCE FROM CL OF EXTERIOR GIRDER TO EDGE OF SLAB IS GREATER THAN 2'-0" AND GIRDER DEPTHS ARE AS SHOWN.

PLAN

☆ 10'-0" ± FOR PRESTRESSED GIRDERS.

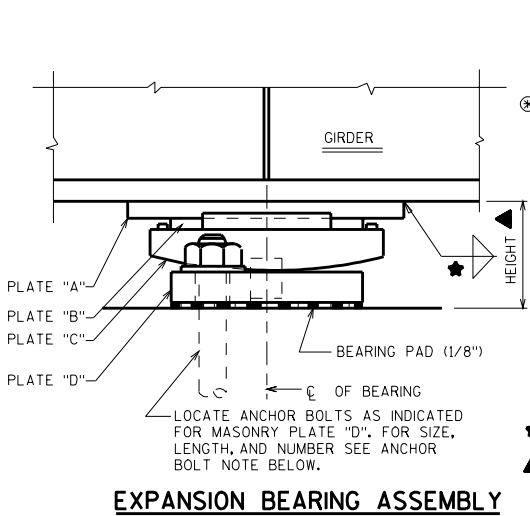
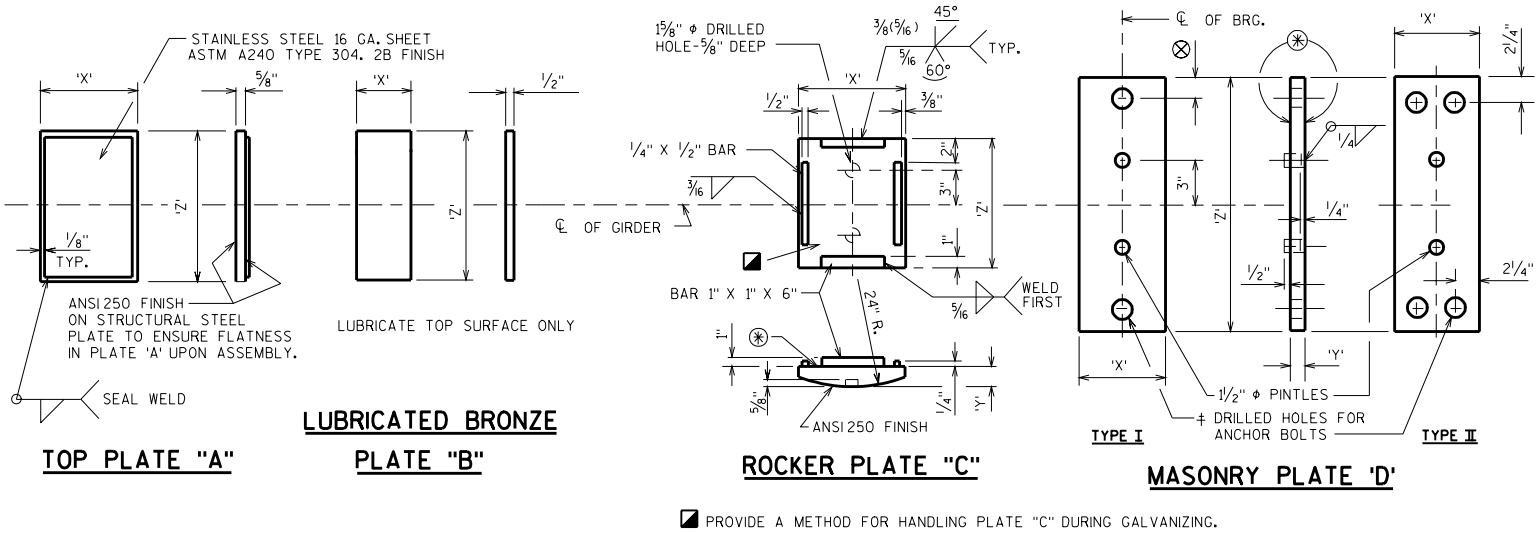
▲ DISTANCE TO SHEAR CONNECTORS FOR STEEL GIRDERS.

EXTERIOR GIRDER BRACING FOR SLAB OVERHANG

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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- NOTES**
- FOR BEARING NOTES, CLEARANCE DIAGRAM, AND WHEN TO BEVEL ROCKER PLATES, SEE STANDARD 27.2.
- ⊗ FINISH THESE SURFACES ANSI 250 IF DIMENSION 'Y' IS GREATER THAN 2".
- ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C". PLATE "C" & "D" SHALL BE GALVANIZED. FOR UNPAINTED STRUCTURES PLATE "C" & "D" SHALL BE SHOP PAINTED AFTER GALVANIZING. PLATE "A" SHALL BE SHOP PAINTED. USE WELDABLE PRIMER ON PLATE "A".
- AT ABUTMENTS WHEN THE "X" DIMENSION OF PLATE "A" EXCEEDS 11" INCREASE STANDARD DISTANCE FROM \bar{C} BRG. TO END OF GIRDER.
- ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING STAINLESS STEEL SHEET, BRONZE PLATE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.
- ★ WELD SIZE, REFER TO STANDARD 24.2.
- ▲ ADJUST HEIGHT IF TAPERED BEARINGS ARE REQUIRED.
- FABRICATOR MAY INCREASE PLATE "A" OR PLATE "D" THICKNESS AS AN ALTERNATE TO SHIMS.
- ⊗ DIMENSION IS 2" WHEN 1/4" ϕ ANCHOR BOLTS ARE USED AND 2/4" WHEN 1/2" ϕ ANCHOR BOLTS ARE USED.

10" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT FEET
	X	Z	X	Z	X	Y	Z	X	Y	Z	
75	9"	10"	5"	10"	7"	1 1/16"	1'-0 1/4"	8"	1 1/2"	1'-8"	.354
105	11"	10"	7"	10"	9"	1 1/16"	1'-0 1/4"	8"	1 1/2"	1'-8"	.375
135	1'-1"	10"	9"	10"	11"	1 1/16"	1'-0 1/4"	8"	1 1/2"	1'-8"	.396
160	1'-3"	10"	11"	10"	1'-1"	2 3/8"	1'-0 1/4"	9"	1 1/2"	1'-8"	.432
190	1'-5"	10"	1'-1"	10"	1'-3"	2 7/8"	1'-0 1/4"	10"	1 3/4"	1'-8"	.495
220	1'-7"	10"	1'-3"	10"	1'-5"	3 3/8"	1'-0 1/4"	1'-0"	2"	1'-8"	.599
250	1'-9"	10"	1'-5"	10"	1'-7"	3 3/8"	1'-0 1/4"	1'-1"	2 3/8"	1'-8"	.630
280	1'-11"	10"	1'-7"	10"	1'-9"	4 7/8"	1'-0 1/4"	1'-3"	2 7/8"	1'-8"	.755
310	2'-1"	10"	1'-9"	10"	1'-11"	4 7/8"	1'-0 1/4"	1'-4"	2 7/8"	1'-8"	.755

12" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT FEET
	X	Z	X	Z	X	Y	Z	X	Y	Z	
90	9"	1'-0"	5"	1'-0"	7"	1 1/16"	1'-2 1/4"	8"	1 1/2"	1'-10"	.354
125	11"	1'-0"	7"	1'-0"	9"	1 1/16"	1'-2 1/4"	8"	1 1/2"	1'-10"	.375
160	1'-1"	1'-0"	9"	1'-0"	11"	1 1/16"	1'-2 1/4"	8"	1 1/2"	1'-10"	.396
195	1'-3"	1'-0"	11"	1'-0"	1'-1"	2 3/8"	1'-2 1/4"	9"	1 1/2"	1'-10"	.432
230	1'-5"	1'-0"	1'-1"	1'-0"	1'-3"	2 7/8"	1'-2 1/4"	11"	2"	1'-10"	.516
265	1'-7"	1'-0"	1'-3"	1'-0"	1'-5"	3 3/8"	1'-2 1/4"	1'-1"	2 3/8"	1'-10"	.630
300	1'-9"	1'-0"	1'-5"	1'-0"	1'-7"	3 3/8"	1'-2 1/4"	1'-2"	2 3/8"	1'-10"	.630
335	1'-11"	1'-0"	1'-7"	1'-0"	1'-9"	4 7/8"	1'-2 1/4"	1'-4"	2 7/8"	1'-10"	.755
370	2'-1"	1'-0"	1'-9"	1'-0"	1'-11"	4 7/8"	1'-2 1/4"	1'-5"	2 7/8"	1'-11"	.755

14" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT FEET
	X	Z	X	Z	X	Y	Z	X	Y	Z	
105	9"	1'-2"	5"	1'-2"	7"	1 1/16"	1'-4 1/4"	8"	1 1/2"	2'-0"	.354
145	11"	1'-2"	7"	1'-2"	9"	1 1/16"	1'-4 1/4"	8"	1 1/2"	2'-0"	.375
185	1'-1"	1'-2"	9"	1'-2"	11"	1 1/16"	1'-4 1/4"	8"	1 1/2"	2'-0"	.396
225	1'-3"	1'-2"	11"	1'-2"	1'-1"	2 3/8"	1'-4 1/4"	10"	1 3/4"	2'-0"	.453
270	1'-5"	1'-2"	1'-1"	1'-2"	1'-3"	2 7/8"	1'-4 1/4"	1'-0"	2"	2'-0"	.516
310	1'-7"	1'-2"	1'-3"	1'-2"	1'-5"	3 3/8"	1'-4 1/4"	1'-1"	2 3/8"	2'-0"	.630
350	1'-9"	1'-2"	1'-5"	1'-2"	1'-7"	3 3/8"	1'-4 1/4"	1'-3"	2 7/8"	2'-1"	.672
390	1'-11"	1'-2"	1'-7"	1'-2"	1'-9"	4 7/8"	1'-4 1/4"	1'-4"	2 7/8"	2'-1"	.755
435	2'-1"	1'-2"	1'-9"	1'-2"	1'-11"	4 7/8"	1'-4 1/4"	1'-6"	3 3/8"	2'-1"	.838

16" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT FEET
	X	Z	X	Z	X	Y	Z	X	Y	Z	
120	9"	1'-4"	5"	1'-4"	7"	1 1/16"	1'-6 1/4"	8"	1 1/2"	2'-2"	.354
165	11"	1'-4"	7"	1'-4"	9"	1 1/16"	1'-6 1/4"	8"	1 1/2"	2'-2"	.375
215	1'-1"	1'-4"	9"	1'-4"	11"	1 1/16"	1'-6 1/4"	9"	1 1/2"	2'-2"	.396
260	1'-3"	1'-4"	11"	1'-4"	1'-1"	2 3/8"	1'-6 1/4"	11"	2"	2'-2"	.474
310	1'-5"	1'-4"	1'-1"	1'-4"	1'-3"	2 7/8"	1'-6 1/4"	1'-0"	2"	2'-2"	.516
355	1'-7"	1'-4"	1'-3"	1'-4"	1'-5"	3 3/8"	1'-6 1/4"	1'-2"	2 3/8"	2'-3"	.630
400	1'-9"	1'-4"	1'-5"	1'-4"	1'-7"	3 3/8"	1'-6 1/4"	1'-3"	2 7/8"	2'-3"	.672
450	1'-11"	1'-4"	1'-7"	1'-4"	1'-9"	4 7/8"	1'-6 1/4"	1'-5"	2 7/8"	2'-3"	.755
500	2'-1"	1'-4"	1'-9"	1'-4"	1'-11"	4 7/8"	1'-6 1/4"	1'-7"	3 3/8"	2'-3"	.838

18" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT FEET
	X	Z	X	Z	X	Y	Z	X	Y	Z	
135	9"	1'-6"	5"	1'-6"	7"	1 1/16"	1'-8 1/4"	8"	1 1/2"	2'-4"	.354
185	11"	1'-6"	7"	1'-6"	9"	1 1/16"	1'-8 1/4"	8"	1 1/2"	2'-4"	.375
240	1'-1"	1'-6"	9"	1'-6"	11"	1 1/16"	1'-8 1/4"	9"	1 1/2"	2'-4"	.396
295	1'-3"	1'-6"	11"	1'-6"	1'-1"	2 3/8"	1'-8 1/4"	11"	2"	2'-4"	.474
350	1'-5"	1'-6"	1'-1"	1'-6"	1'-3"	2 7/8"	1'-8 1/4"	1'-1"	2 3/8"	2'-5"	.547
400	1'-7"	1'-6"	1'-3"	1'-6"	1'-5"	3 3/8"	1'-8 1/4"	1'-2"	2 3/8"	2'-5"	.630
455	1'-9"	1'-6"	1'-5"	1'-6"	1'-7"	3 3/8"	1'-8 1/4"	1'-4"	2 7/8"	2'-5"	.672
505	1'-11"	1'-6"	1'-7"	1'-6"	1'-9"	4 7/8"	1'-8 1/4"	1'-6"	3 3/8"	2'-5"	.838
560	2'-1"	1'-6"	1'-9"	1'-6"	1'-11"	4 7/8"	1'-8 1/4"	1'-8"	3 3/8"	2'-5"	.838

20" BEARING

CAP. KIPS	PLATE A		PLATE B		PLATE C			PLATE D			HEIGHT FEET
	X	Z	X	Z	X	Y	Z	X	Y	Z	
150	9"	1'-8"	5"	1'-8"	7"	1 1/16"	1'-10 1/4"	8"	1 1/2"	2'-6"	.354
210	11"	1'-8"	7"	1'-8"	9"	1 1/16"	1'-10 1/4"	8"	1 1/2"	2'-6"	.375
270	1'-1"	1'-8"	9"	1'-8"	11"	1 1/16"	1'-10 1/4"	10"	1 3/4"	2'-6"	.417
325	1'-3"	1'-8"	11"	1'-8"	1'-1"	2 3/8"	1'-10 1/4"	11"	2"	2'-6"	.474
385	1'-5"	1'-8"	1'-1"	1'-8"	1'-3"	2 7/8"	1'-10 1/4"	1'-1"	2 3/8"	2'-7"	.547
445	1'-7"	1'-8"	1'-3"	1'-8"	1'-5"	3 3/8"	1'-10 1/4"	1'-3"	2 7/8"	2'-7"	.672
505	1'-9"	1'-8"	1'-5"	1'-8"	1'-7"	3 3/8"	1'-10 1/4"	1'-5"	2 7/8"	2'-7"	.672
565	1'-11"	1'-8"	1'-7"	1'-8"	1'-9"	4 7/8"	1'-10 1/4"	1'-7"	3 3/8"	2'-7"	.838
625	2'-1"	1'-8"	1'-9"	1'-8"	1'-11"	4 7/8"	1'-10 1/4"	1'-9"	3 3/8"	2'-7"	.838

ANCHOR BOLT NOTES:

FOR SPAN LENGTHS UP TO 100'-0", USE A TYPE C MASONRY PLATE 'D' WITH (2) 1/4" ϕ X 1'-5" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 100'-0" UP TO 150'-0", USE A TYPE C MASONRY PLATE "D" WITH (2) 1/2" ϕ X 1'-10" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0", USE A TYPE C MASONRY PLATE "D" WITH (4) 1/2" ϕ X 1'-10" LONG ANCHOR BOLTS.

‡ DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 3/8" LARGER THAN ANCHOR BOLT.

EXPANSION BEARING DETAILS
TYPE 'A'-STEEL GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99

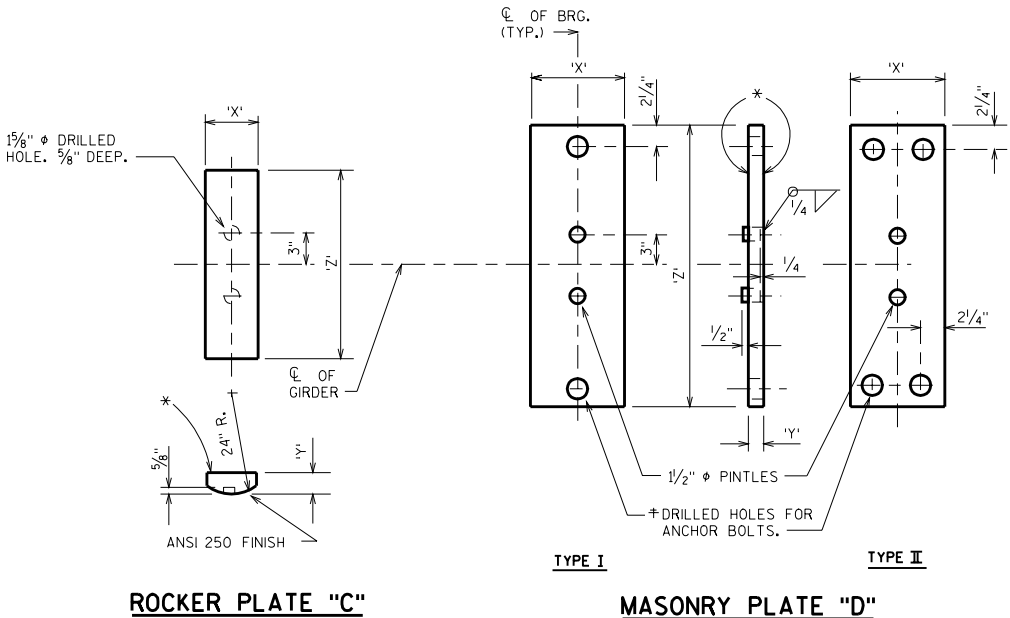
LENGTH OF PLATE "C"	CAP. KIPS	PLATE C			PLATE D			HEIGHT FEET
		X	Y	Z	X	Y	Z	
10"	150	5"	1 $\frac{5}{8}$ "	10"	8"	1 $\frac{1}{2}$ "	1'-7"	.2969
12"	185	5"	1 $\frac{5}{8}$ "	1'-0"	9"	1 $\frac{1}{2}$ "	1'-9"	.2969
	205	5"	1 $\frac{5}{8}$ "	1'-0"	10"	1 $\frac{3}{4}$ "	1'-9"	.3177
14"	205	5"	1 $\frac{5}{8}$ "	1'-2"	9"	1 $\frac{1}{2}$ "	1'-11"	.2969
	250	5"	1 $\frac{5}{8}$ "	1'-2"	11"	2"	1'-11"	.3385
	295	5"	2 $\frac{3}{8}$ "	1'-2"	1'-1"	2 $\frac{3}{8}$ "	1'-11"	.4063
	355	5"	2 $\frac{3}{8}$ "	1'-2"	1'-3"	2 $\frac{7}{8}$ "	2'-0"	.4479
	405	5"	2 $\frac{3}{8}$ "	1'-2"	1'-5"	2 $\frac{7}{8}$ "	2'-0"	.4479
16"	195	5"	1 $\frac{5}{8}$ "	1'-4"	8"	1 $\frac{1}{2}$ "	2'-1"	.2969
	245	5"	1 $\frac{5}{8}$ "	1'-4"	10"	1 $\frac{3}{4}$ "	2'-1"	.3177
	295	5"	1 $\frac{5}{8}$ "	1'-4"	1'-0"	2"	2'-1"	.3385
	360	5"	2 $\frac{3}{8}$ "	1'-4"	1'-2"	2 $\frac{3}{8}$ "	2'-2"	.4063
	410	5"	2 $\frac{3}{8}$ "	1'-4"	1'-4"	2 $\frac{7}{8}$ "	2'-2"	.4479
	455	5"	2 $\frac{3}{8}$ "	1'-4"	1'-6"	3 $\frac{1}{8}$ "	2'-2"	.5313
	485	5"	2 $\frac{3}{8}$ "	1'-4"	1'-7"	3 $\frac{1}{8}$ "	2'-2"	.5313
18"	240	5"	1 $\frac{5}{8}$ "	1'-6"	9"	1 $\frac{1}{2}$ "	2'-3"	.2969
	295	5"	1 $\frac{5}{8}$ "	1'-6"	11"	2"	2'-3"	.3385
	360	5"	1 $\frac{5}{8}$ "	1'-6"	1'-1"	2 $\frac{3}{8}$ "	2'-4"	.3698
	385	5"	1 $\frac{5}{8}$ "	1'-6"	1'-2"	2 $\frac{3}{8}$ "	2'-4"	.3698
	445	5"	2 $\frac{3}{8}$ "	1'-6"	1'-4"	2 $\frac{7}{8}$ "	2'-4"	.4479
	495	5"	2 $\frac{3}{8}$ "	1'-6"	1'-6"	3 $\frac{1}{8}$ "	2'-4"	.5313
20"	550	5"	2 $\frac{3}{8}$ "	1'-6"	1'-8"	3 $\frac{7}{8}$ "	2'-4"	.5313
	255	5"	1 $\frac{5}{8}$ "	1'-8"	9"	1 $\frac{1}{2}$ "	2'-5"	.2969
	285	5"	1 $\frac{5}{8}$ "	1'-8"	10"	1 $\frac{3}{4}$ "	2'-5"	.3177
	355	5"	1 $\frac{5}{8}$ "	1'-8"	1'-0"	2"	2'-6"	.3385
	415	5"	1 $\frac{5}{8}$ "	1'-8"	1'-2"	2 $\frac{3}{8}$ "	2'-6"	.3698
	470	5"	2 $\frac{3}{8}$ "	1'-8"	1'-4"	2 $\frac{7}{8}$ "	2'-6"	.4479
	530	5"	2 $\frac{3}{8}$ "	1'-8"	1'-6"	3 $\frac{1}{8}$ "	2'-6"	.5313
	590	5"	2 $\frac{3}{8}$ "	1'-8"	1'-8"	3 $\frac{7}{8}$ "	2'-6"	.5313
22"	620	5"	2 $\frac{3}{8}$ "	1'-8"	1'-9"	3 $\frac{7}{8}$ "	2'-6"	.5313
	305	5"	1 $\frac{5}{8}$ "	1'-10"	10"	1 $\frac{3}{4}$ "	2'-7"	.3177
	380	5"	1 $\frac{5}{8}$ "	1'-10"	1'-0"	2"	2'-8"	.3385
	445	5"	1 $\frac{5}{8}$ "	1'-10"	1'-2"	2 $\frac{3}{8}$ "	2'-8"	.3698
	500	5"	1 $\frac{5}{8}$ "	1'-10"	1'-4"	2 $\frac{7}{8}$ "	2'-8"	.4115
	565	5"	2 $\frac{3}{8}$ "	1'-10"	1'-6"	3 $\frac{1}{8}$ "	2'-8"	.5313
	630	5"	2 $\frac{3}{8}$ "	1'-10"	1'-8"	3 $\frac{7}{8}$ "	2'-8"	.5313
	695	5"	2 $\frac{3}{8}$ "	1'-10"	1'-10"	3 $\frac{7}{8}$ "	2'-8"	.5313
	725	5"	2 $\frac{3}{8}$ "	1'-10"	1'-11"	3 $\frac{7}{8}$ "	2'-8"	.5313

ANCHOR BOLT NOTES

FOR SPAN LENGTHS UP TO 100'-0"; USE A TYPE C MASONRY PLATE "D" WITH (2) - 1 $\frac{1}{4}$ " ϕ x 1'-5" LONG ANCHOR BOLTS.

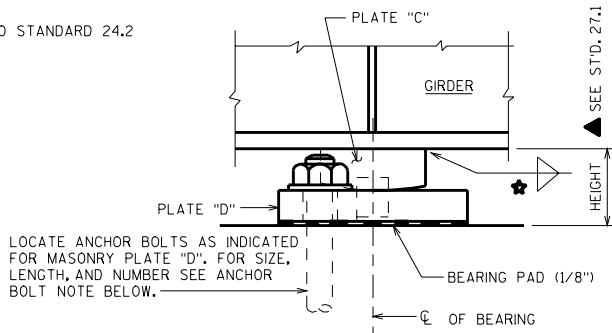
FOR SPAN LENGTHS FROM 100'-0" UP TO 150'-0"; USE A TYPE C MASONRY PLATE "D" WITH (2) - 1 $\frac{1}{2}$ " ϕ x 1'-10" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0"; USE A TYPE C MASONRY PLATE "D" WITH (4) - 1 $\frac{1}{2}$ " ϕ x 1'-10" LONG ANCHOR BOLTS.

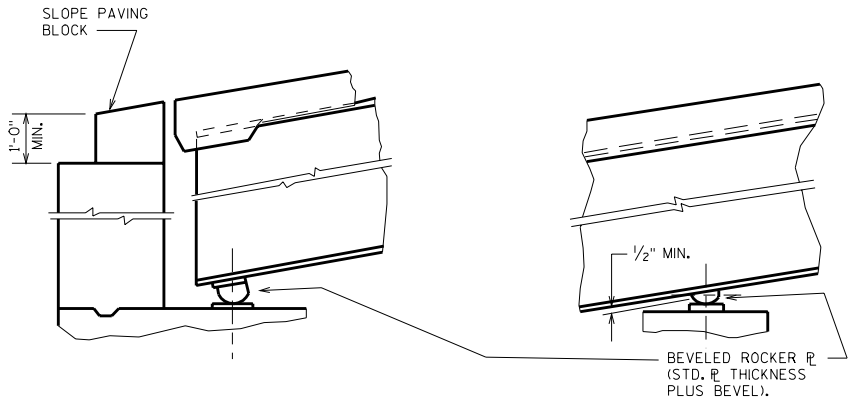


* FINISH THESE SURFACES ANSI 250 IF DIMENSION IS GREATER THAN 2"

★ FOR WELD SIZE, REFER TO STANDARD 24.2



FIXED BEARING ASSEMBLY



AT EXPANSION BRG.

AT FIXED BRG.

BEVELED ROCKERS WITH GRADES GREATER THAN 3%

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT C OF GIRDER AND C OF BEARING.

FABRICATOR MAY INCREASE PLATE "D" THICKNESS AS AN ALTERNATE TO SHIMS

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "D" PLATE THICKNESS + 2 $\frac{1}{4}$ " ABOVE TOP OF CONCRETE.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING PINTLES, ANCHOR BOLTS, NUTS & WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ALL MATERIALS IN TYPE "A" BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR EITHER "EXPANSION BEARING ASSEMBLIES" OR "FIXED BEARING ASSEMBLIES".

CHAMFER TOP OF PINTLES 1/8". DRILL HOLES FOR PINTLES IN ALL MASONRY PLATES FOR DRIVING FIT.

PROVIDE 1/8" THICK BEARING PAD SAME SIZE AS MASONRY PLATE "D" FOR EACH BEARING.

HEIGHT OF BEARINGS GIVEN IN TABLES INCLUDES 1/8" BEARING PADS.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

† DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 3/8" LARGER THAN ANCHOR BOLT.

ALL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 36, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C".

PLATE "C" SHALL NOT BE GALVANIZED. PLATE "C" SHALL BE SHOP PAINTED. USE WELDABLE PRIMER.

PLATE "D" SHALL BE GALVANIZED. FOR UNPAINTED STRUCTURES, PLATE "D" SHALL BE SHOP PAINTED AFTER GALVANIZING.

DESIGNER NOTES

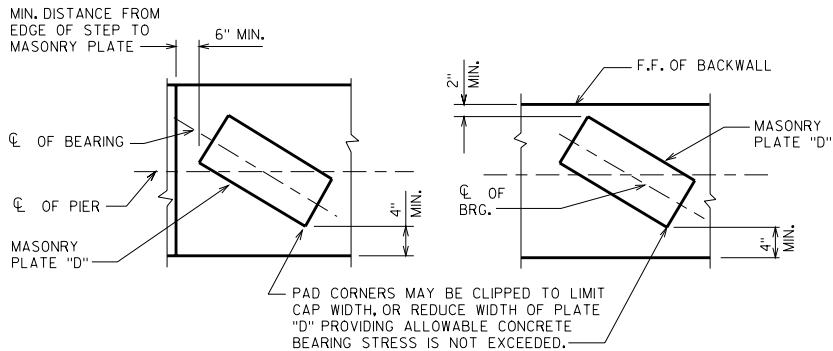
THE BEARING NOTES PERTAIN TO BOTH EXPANSION AND FIXED BEARINGS.

REFER TO DETAIL FOR THE USE OF BEVELED ROCKERS FOR GRADES GREATER THAN 3%.

DESIGN DATA

CONCRETE MASONRY = 1 KIP PER SQ. IN.

MAXIMUM HORIZONTAL FORCE = 70 KIPS



AT SKEWED PIER

AT SKEWED ABUTMENTS

CLEARANCE DIAGRAM

FIXED BEARING DETAILS TYPE "A"-STEEL GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99



* FOR REACTION ≥ 1000 KIPS
USE 2" STIFFENERS.

TABLE OF DIMENSIONS

[illegible]

GENERAL NOTES

FABRICATOR MAY INCREASE 'BASE PLATE' THICKNESS AS AN ALTERNATE TO SHIMS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS. ON WELDED BEARINGS, FINAL MACHINING CAN BE PERFORMED BEFORE WELDING IS COMPLETED.

ALL MATERIAL IN TYPE "B" ROCKER BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "EXPANSION BEARING ASSEMBLIES".

ALL MATERIALS FOR BEARINGS INCLUDING SHIMS BUT EXCLUDING
PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO
A.S.T.M. SPECIFICATION TYPE A709 GRADE 50W STEEL.

PINTLES SHALL CONFORM TO A.S.T.M. SPECIFICATION TYPE A449 STEEL. PINTLES SHALL BE MACHINED TO A DRIVING FIT.

ALL ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO A.S.T.M. SPECIFICATION TYPE A709 GRADE 36 STEEL. ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "M" PLATE THICKNESS + 2 1/4" ABOVE TOP OF CONCRETE MASONRY. CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

RADIAL SURFACES ON ROCKER SHALL BE MACHINE FINISHED AFTER WELDING.

ALL SURFACES MARKED "F" SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS. THE CONTACT AREA OF BOTTOM SURFACE OF THE GIRDER FLANGE SHALL BE MACHINE FINISHED.

ANCHOR BOLT EDGE DISTANCE ALONG "L" MAY BE INCREASED FROM MINIMUM SHOWN WHEN A COMMON GRID DETAIL IS DESIRED FOR SEVERAL BEARINGS.

FOR UNPAINTED STRUCTURES THE UPPER 6" OF ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS C OR B633.


ROCKER SETTING DATA

TEMPERATURE TIME OF SETTING - °F				
	PIER	PIER	PIER	PIER
120				
100				
80				
60				
40				
20				
0				
-20				

ROCKER BEARING SHALL BE SET VERTICAL AT 45° F.

ROCKER BEARING SHALL BE USED WITH A MINIMUM FRICTION VALUE OF 2% AND A MAXIMUM FRICTION VALUE OF 4%.

MAXIMUM MOVEMENT FROM 45° F = (D - 1")/2
BUT ACTUAL MOVEMENT NOT TO EXCEED R/3.

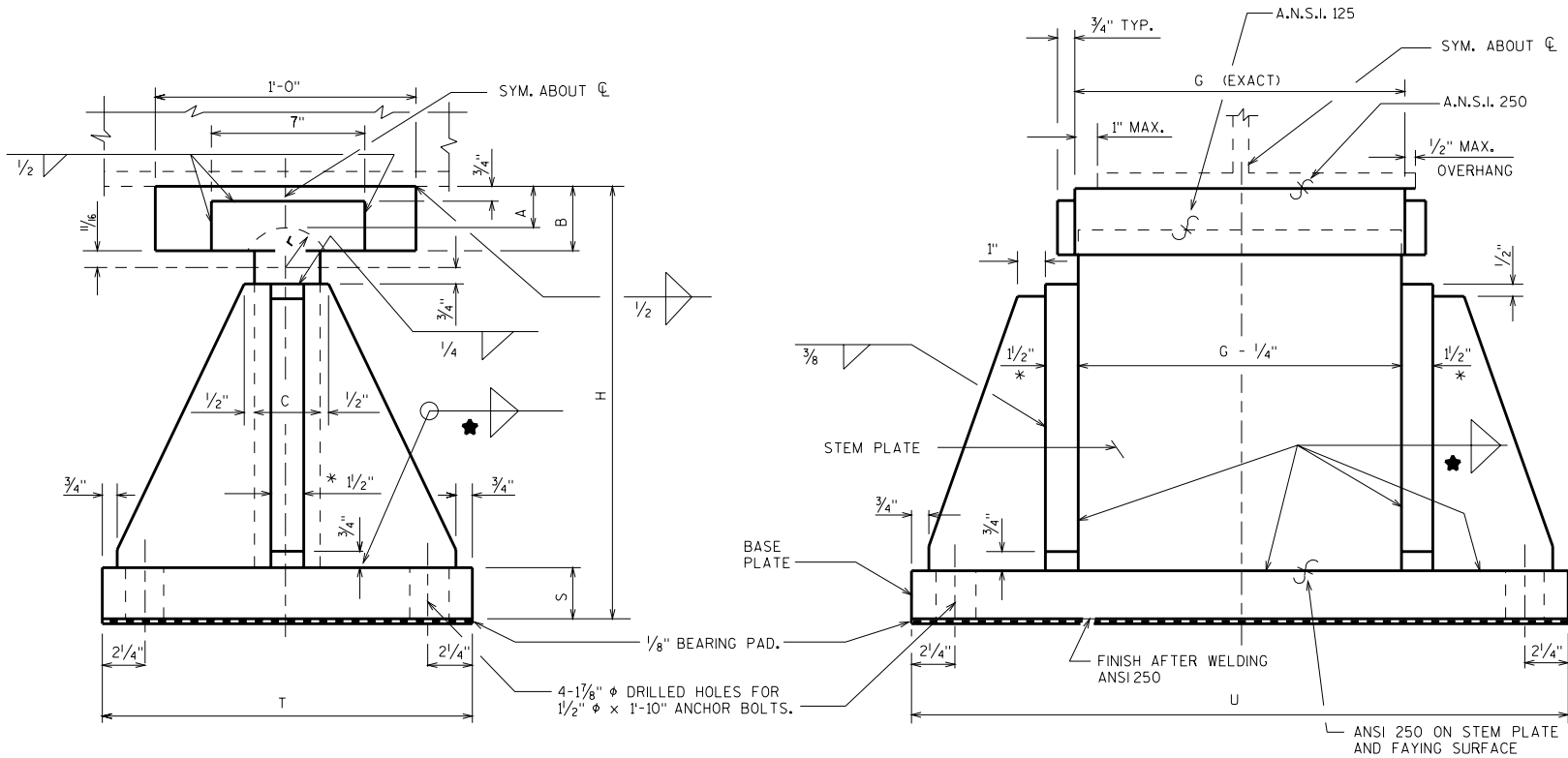
 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ROCKER BEARING TYPE "B" - STEEL GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED:

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1/99



FIXED SHOE

★ 400 K ≤ REACTION < 1000 K, USE 5/8" WELD.
1000 K ≤ REACTION ≤ 1500 K, USE 3/4" WELD

* FOR REACTIONS ≥ 1000 KIPS
USE 2" STIFFENERS.

TABLE OF DIMENSIONS

REACTION (KIPS)	A	B	C	G VALUES						H	r		S	T
				G=1'-7"	G=1'-9"	G=1'-11"	G=2'-1"	G=2'-3"	G=2'-5"		STEM	PLATE		
				U	U	U	U	U	U					
400-499	1 ⁵ / ₁₆ "	2 ⁵ / ₁₆ "	3"	2'-8"	2'-8"	2'-10"	3'-0"	—	—	1'-6"	1 ¹ / ₁₆ "	1 ⁵ / ₆₄ "	2 ³ / ₈ "	1'-4"
500-599	1 ⁵ / ₁₆ "	2 ⁵ / ₁₆ "	3"	3'-0"	3'-0"	3'-0"	3'-0"	—	—	1'-7"	1 ¹ / ₁₆ "	1 ⁵ / ₆₄ "	2 ³ / ₈ "	1'-5"
600-699	1 ⁵ / ₁₆ "	2 ⁵ / ₁₆ "	3"	—	3'-3"	3'-3"	3'-3"	3'-3"	—	1'-9"	1 ¹ / ₁₆ "	1 ⁵ / ₆₄ "	2 ³ / ₈ "	1'-6"
700-799	2 ³ / ₁₆ "	3 ¹ / ₁₆ "	3 ¹ / ₂ "	—	—	3'-6"	3'-6"	3'-6"	3'-6"	1'-10"	1 ⁵ / ₁₆ "	1 ⁵ / ₆₄ "	2 ⁷ / ₈ "	1'-7"
800-899	2 ³ / ₁₆ "	3 ¹ / ₁₆ "	3 ¹ / ₂ "	—	—	3'-9"	3'-9"	3'-9"	3'-9"	2'-0"	1 ⁵ / ₁₆ "	1 ⁵ / ₆₄ "	2 ⁷ / ₈ "	1'-8"
900-999	2 ³ / ₁₆ "	3 ¹ / ₁₆ "	3 ¹ / ₂ "	—	—	3'-10"	3'-10"	3'-10"	3'-10"	2'-1"	1 ⁵ / ₁₆ "	1 ⁵ / ₆₄ "	2 ⁷ / ₈ "	1'-10"
1000-1099	2 ³ / ₁₆ "	3 ⁵ / ₁₆ "	4"	—	—	—	4'-0"	4'-0"	4'-0"	2'-3"	2 ³ / ₁₆ "	2 ⁹ / ₆₄ "	3 ³ / ₈ "	1'-11"
1100-1199	2 ³ / ₁₆ "	3 ⁵ / ₁₆ "	4"	—	—	—	4'-2"	4'-2"	4'-2"	2'-4"	2 ³ / ₁₆ "	2 ⁹ / ₆₄ "	3 ³ / ₈ "	2'-0"
1200-1299	2 ³ / ₁₆ "	3 ⁵ / ₁₆ "	4"	—	—	—	—	4'-4"	4'-4"	2'-5"	2 ³ / ₁₆ "	2 ⁹ / ₆₄ "	3 ³ / ₈ "	2'-1"
1300-1399	2 ³ / ₁₆ "	3 ⁵ / ₁₆ "	4"	—	—	—	—	4'-6"	4'-6"	2'-6"	2 ³ / ₁₆ "	2 ⁹ / ₆₄ "	3 ³ / ₈ "	2'-2"
1400-1500	2 ³ / ₁₆ "	3 ⁵ / ₁₆ "	4"	—	—	—	—	4'-8"	4'-8"	2'-7"	2 ³ / ₁₆ "	2 ⁹ / ₆₄ "	3 ³ / ₈ "	2'-3"

NOTES

FABRICATOR MAY INCREASE 'BASE PLATE' THICKNESS AS AN ALTERNATE TO SHIMS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS, ON WELDED BEARINGS. FINAL MACHINING CAN BE PERFORMED BEFORE WELDING IS COMPLETED.

ALL MATERIAL FOR BEARINGS INCLUDING SHIMS BUT EXCLUDING ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO A.S.T.M. SPECIFICATION TYPE A709 GRADE 50W STEEL.

ALL ANCHOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO A.S.T.M. SPECIFICATION TYPE A709 GRADE 36 STEEL. ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "S" PLATE THICKNESS + 2/4" ABOVE TOP OF CONCRETE MASONRY. CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

AFTER WELDING SHOE ASSEMBLY, FINISH BOTTOM OF BASE PLATE TO A FLAT SURFACE.

ALL SURFACES MARKED "F" SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS. THE CONTACT AREA OF BOTTOM SURFACE OF THE GIRDER FLANGE SHALL BE MACHINE FINISHED.

ANCHOR BOLT DISTANCES ALONG "T" OR "U" MAY BE INCREASED FROM MINIMUM SHOWN WHEN A COMMON GRID DETAIL IS DESIRED FOR SEVERAL BEARINGS.

FOR UNPAINTED STRUCTURES THE UPPER 6" OF THE ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY A.S.T.M. DESIGNATION A153, CLASS C OR B633.

ALL MATERIALS IN TYPE "B" FIXED SHOE BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "FIXED BEARING ASSEMBLIES".

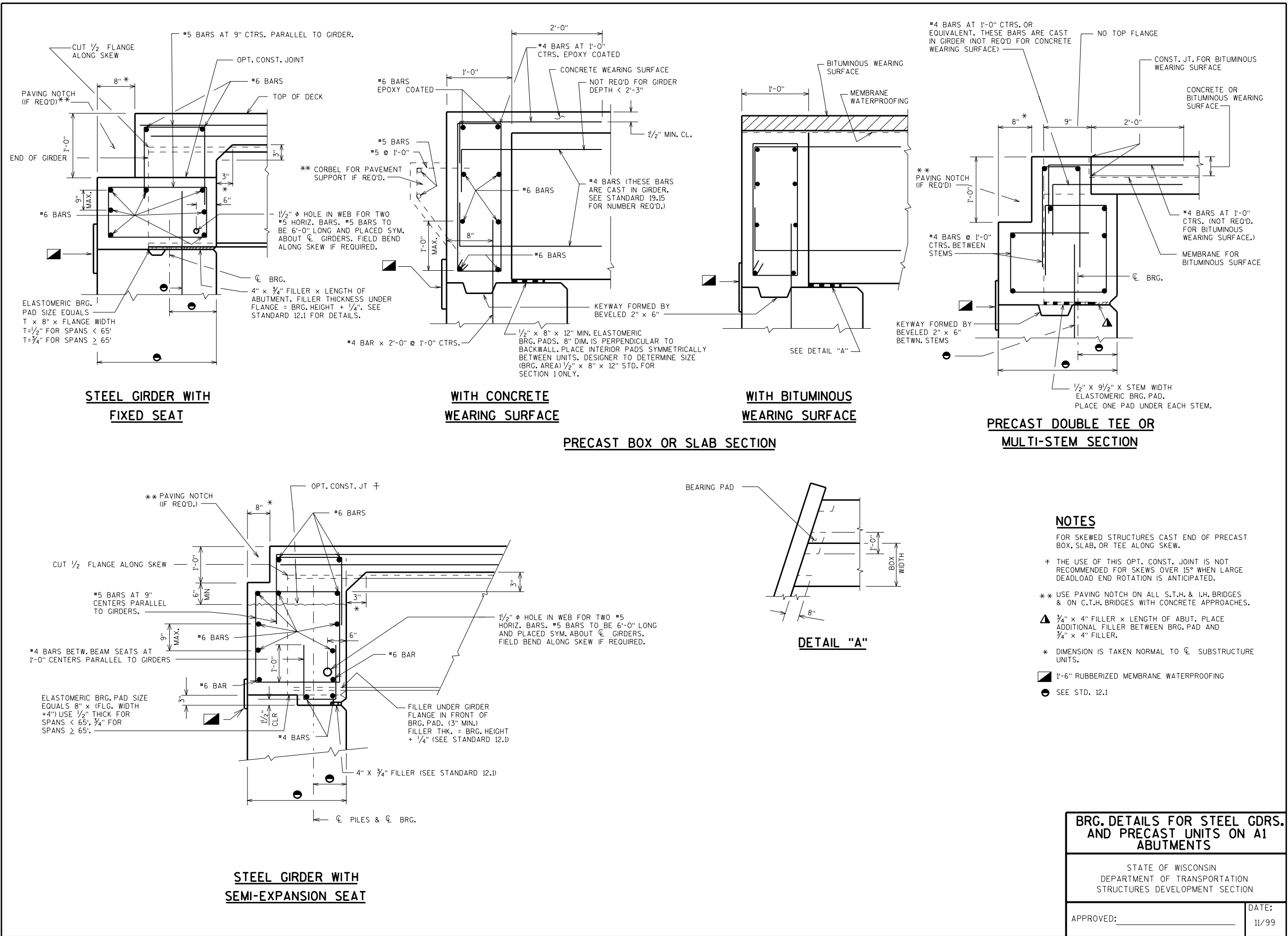
OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

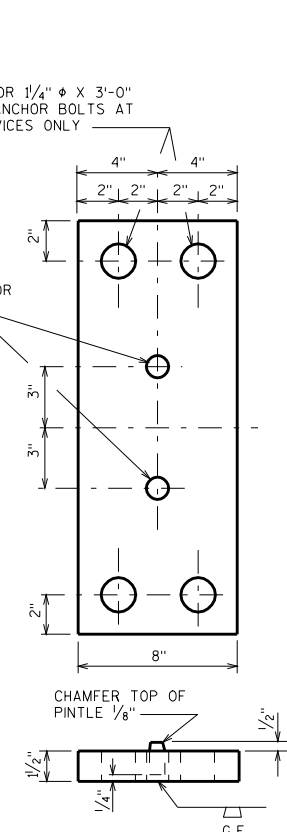
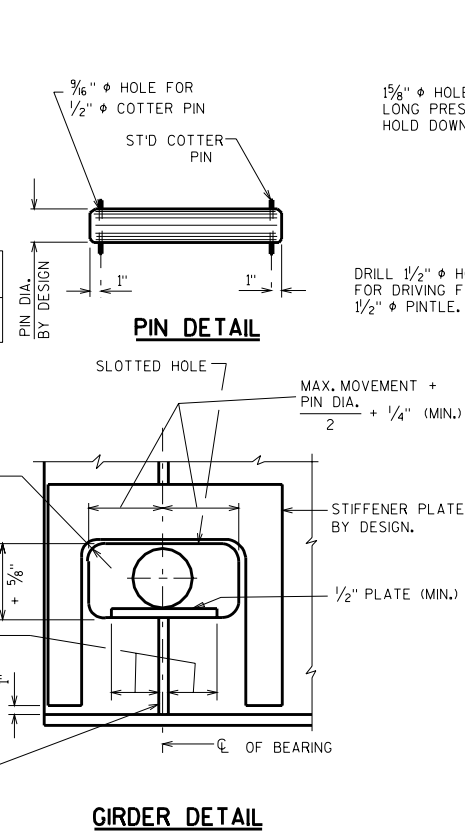
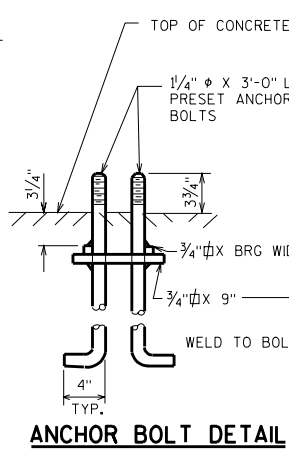
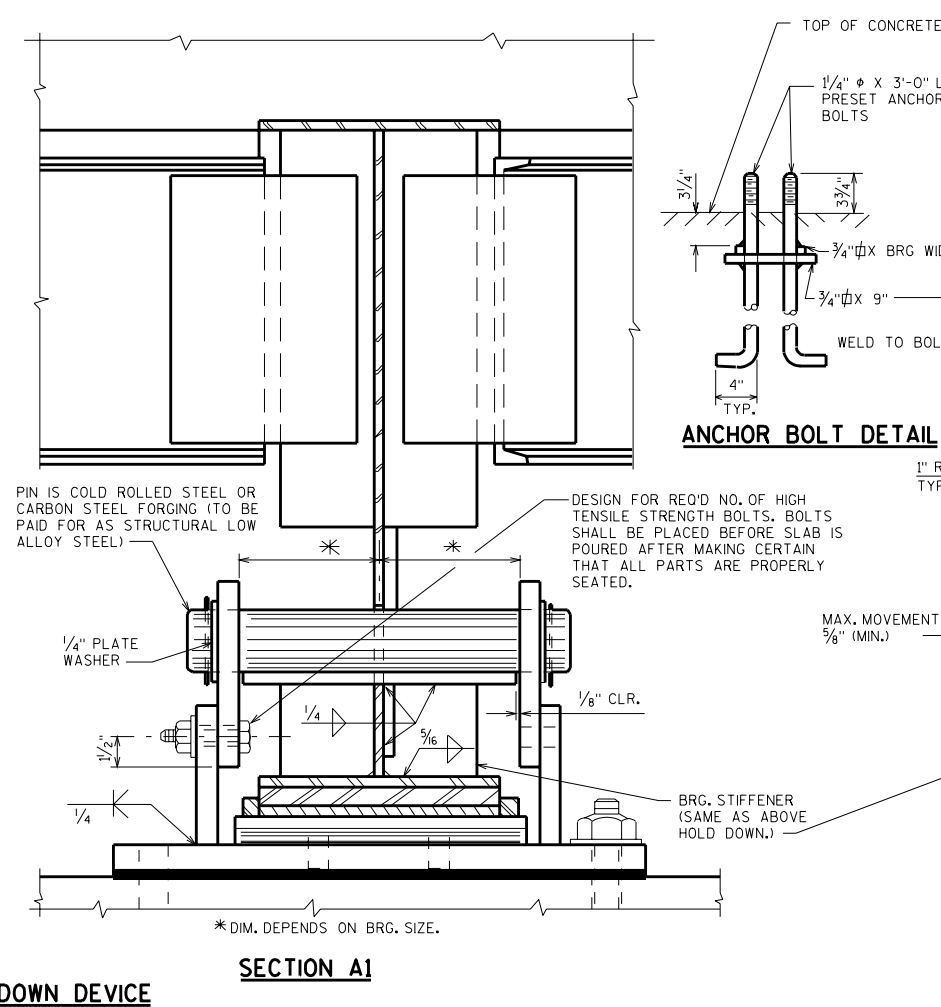
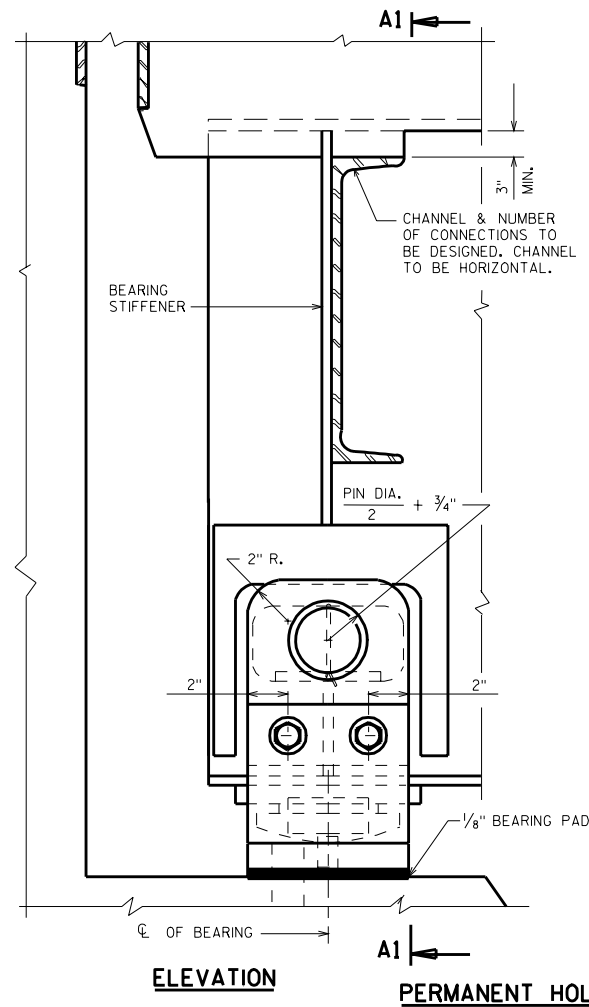
**TYPE "B" - STEEL GIRDERS
FIXED SHOE**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

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1/99





NOTES (PERMANENT HOLD DOWN DEVICE)

ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS

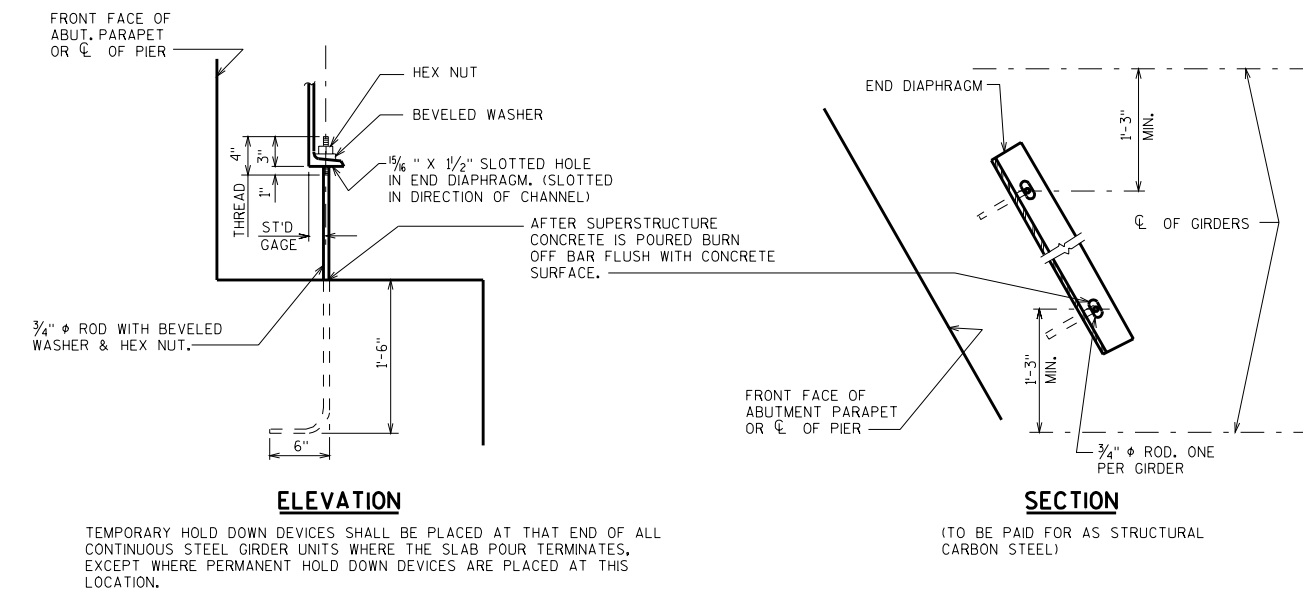
ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX. NUT PER BOLT. CHAMFER TOP OF ANCHOR BOLTS PRIOR TO THREADING.

ALL MATERIAL EXCEPT PINTLES, ANCHOR BOLTS, NUTS, WASHERS AND PINS SHALL BE MADE OF A709 GRADE 50W STEEL.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ALL MATERIALS IN BEARINGS INCLUDING HOLD DOWN SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARINGS".

WHEN REQUIRED, HOLD DOWN DEVICES SHALL BE PLACED SYMMETRICALLY ABOUT LONGIT. ϕ OF FRAMING PLAN. MAXIMUM SPACING OF HOLD DOWNS SHALL BE AT ALTERNATE GIRDERS. HOLD DOWN DEVICE TO BE DESIGNED FOR MIN. UPLIFT CAPACITY OF 20 KIPS.



TEMPORARY HOLD DOWN DEVICES SHALL BE PLACED AT THAT END OF ALL CONTINUOUS STEEL GIRDER UNITS WHERE THE SLAB POUR TERMINATES, EXCEPT WHERE PERMANENT HOLD DOWN DEVICES ARE PLACED AT THIS LOCATION.

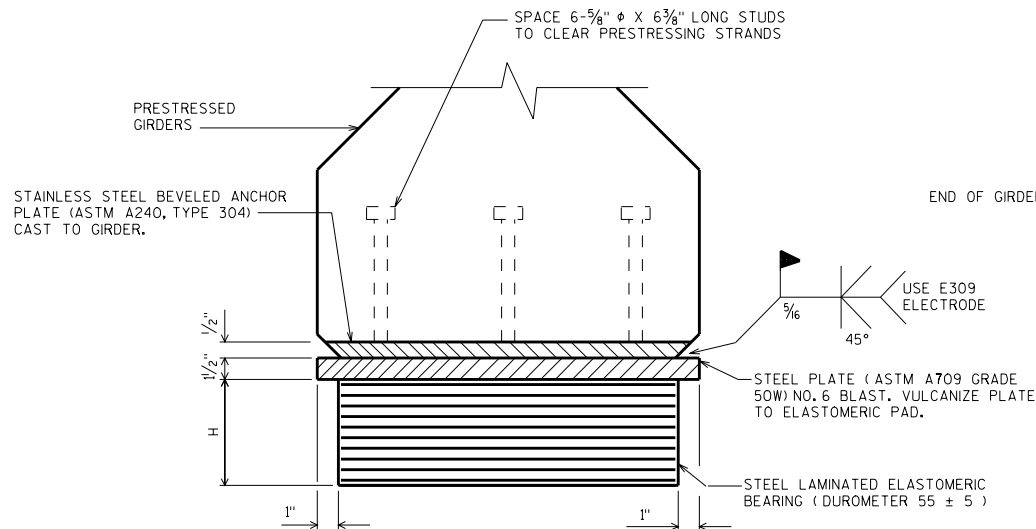
(TO BE PAID FOR AS STRUCTURAL CARBON STEEL)

TEMPORARY HOLD DOWN DEVICE

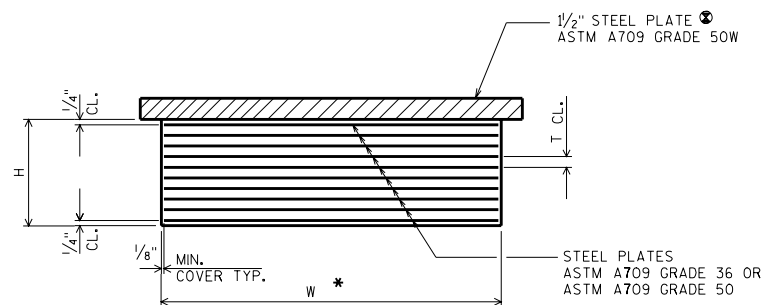
HOLD DOWN DEVICES

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99



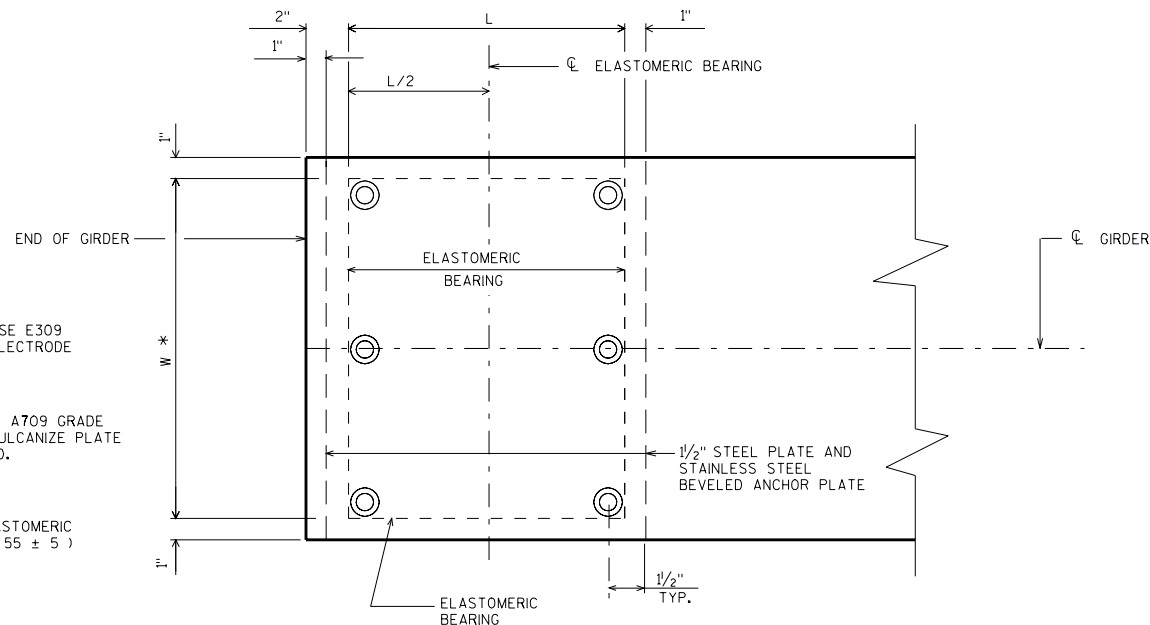
END VIEW



SECTION THRU ELASTOMERIC BEARING

* W = BOTTOM FLANGE WIDTH OF PRESTRESSED GIRDERS MINUS 2"

⊗ CHECK AASHTO 14.4.1.4 REQUIREMENTS TO SEE IF THIS PLATE SHOULD BE TAPERED.



PLAN VIEW

EXPANSION BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

Δ_H (INCHES)	EXP. LENGTH (FEET) ★	TOTAL BEARING HEIGHT H (INCHES)	TOTAL ELASTOMER THICKNESS (INCHES)	LONGITUDINAL LENGTH OF BEARING L (MIN.) ▲	STEEL PLATE THICKNESS (INCHES) EACH	ELASTOMER THICKNESS T (INCHES)	NO. OF PLATES REQ'D.
1"	135	2 1/2"	2"	8"	1/8"	1/2"	4
1 1/4"	170	3 1/8"	2 1/2"	10"	1/8"	1/2"	5
1 1/2"	205	3 3/4"	3"	1'-0"	1/8"	1/2"	6
1 3/4"	240	4 3/8"	3 1/2"	1'-2"	1/8"	1/2"	7
2"	275	5"	4"	1'-3"	1/8"	1/2"	8
2 1/4"	310	5 5/8"	4 1/2"	1'-5"	1/8"	1/2"	9

★ THE "EXPANSION LENGTH" IN THE TABLE WAS CALCULATED BASED ON THE TOTAL ELASTOMER THICKNESS IN COLUMN (4). IT IS FOUND BY APPLYING AASHTO (14.4.1.3), USING A TEMPERATURE RANGE OF 100° F. AND A COEFFICIENT OF THERMAL EXPANSION OF 0.000006 FT./FT./°F. THE DESIGNER IS TO SELECT PRELIMINARY BEARING DATA FROM THE TABLE BASED ON "EXPANSION LENGTH" AND THEN COMPLETE THE DESIGN BY SATISFYING ALL CRITERIA IN AASHTO SECTION 14 (DIVISION I). (SEE SECTION 27.7 IN "BRIDGE MANUAL" FOR DESIGN EXAMPLE.)

▲ L (MIN.) IS BASED ON STABILITY REQUIREMENTS (AASHTO 14.4.1.5).

Δ_H = TOTAL HORIZONTAL MOVEMENT OF SUPERSTRUCTURE MEASURED FROM STATE AT WHICH BEARING IS UNDEFORMED.

NOTES

ALL MATERIAL USED FOR BEARINGS SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "LAMINATED ELASTOMERIC BEARING PADS".

ON BEARING REPLACEMENTS, COMPRESSION LOAD AND ADHESION TESTS WILL BE WAIVED WHERE BEARINGS ARE DETAILED TO MEET HEIGHT REQUIREMENTS.

ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

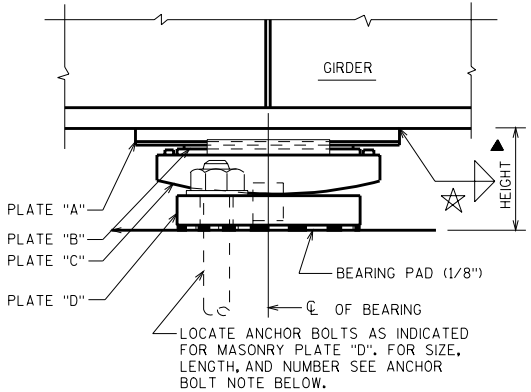
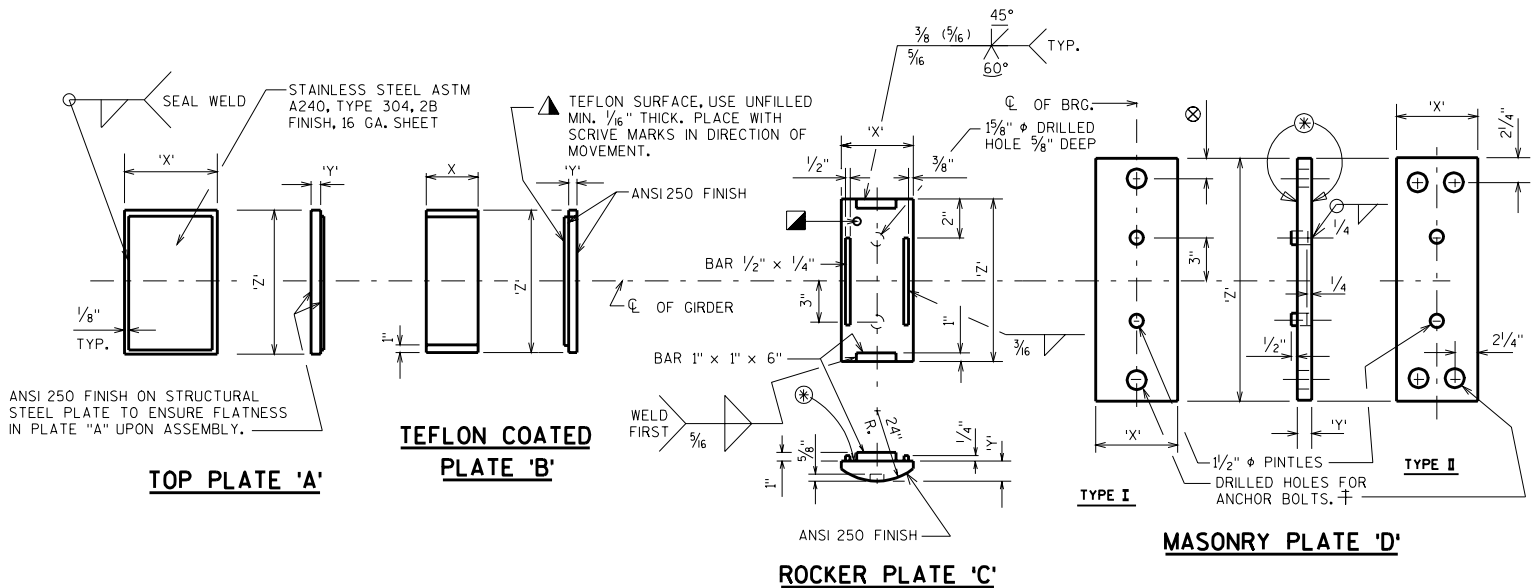
ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ELASTOMERIC BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
6/02



EXPANSION BEARING ASSEMBLY

NOTES

FOR BEARING NOTES, CLEARANCE DIAGRAM, AND WHEN TO BEVEL ROCKER PLATES. SEE STANDARD 27.2.

⊗ FINISH THESE SURFACES ANSI250 IF DIMENSION "Y" IS GREATER THAN 2".

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C". PLATE "C" & "D" SHALL BE GALVANIZED. FOR UNPAINTED STRUCTURES PLATE "C" & "D" SHALL BE SHOP PAINTED AFTER GALVANIZING. PLATE "A" & "B" SHALL BE SHOP PAINTED. USE WELDABLE PRIMER ON PLATE "A".

AT ABUTMENTS WHEN THE "X" DIMENSION OF PLATE "A" EXCEEDS 11" INCREASE STANDARD DISTANCE FROM CL BRG. TO END OF GIRDER.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING STAINLESS STEEL SHEET, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

★ WELD SIZE, REFER TO STANDARD 24.2.

▲ ADJUST HEIGHT IF TAPERED BEARINGS ARE REQUIRED. FABRICATOR MAY INCREASE PLATE "A" OR PLATE "D" THICKNESS AS AN ALTERNATE TO SHIMS.

⊗ DIMENSION IS 2" WHEN 1/4" ⌀ ANCHOR BOLTS ARE USED AND 2 1/4" WHEN 1/2" ⌀ ANCHOR BOLTS ARE USED.

ALL MATERIALS IN TYPE "A-T" BEARINGS, INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "EXPANSION BEARING ASSEMBLIES".

10" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
80	9"	5/8"	10"	5"	1/2"	10"	7"	1 1/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	.360
145	1'-1"	5/8"	10"	9"	1/2"	10"	11"	2 3/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	.438
205	1'-5"	5/8"	10"	1'-1"	1/2"	10"	1'-3"	3 3/8"	1'-0 1/4"	11"	2"	1'-8"	.604

12" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
100	9"	5/8"	1'-0"	5"	1/2"	1'-0"	7"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	.360
140	11"	5/8"	1'-0"	7"	1/2"	1'-0"	9"	1 5/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	.401
220	1'-3"	5/8"	1'-0"	11"	1/2"	1'-0"	1'-1"	2 7/8"	1'-2 1/4"	11"	2"	1'-10"	.521

14" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
170	11"	5/8"	1'-2"	7"	1/2"	1'-2"	9"	1 5/8"	1'-4 1/4"	8"	1 1/2"	2'-0"	.401
310	1'-5"	5/8"	1'-2"	1'-1"	1/2"	1'-2"	1'-3"	3 3/8"	1'-4 1/4"	1'-2"	2 3/8"	2'-0"	.635
405	1'-9"	5/8"	1'-2"	1'-5"	1/2"	1'-2"	1'-7"	4 7/8"	1'-4 1/4"	1'-5"	2 7/8"	2'-1"	.760

16" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
195	11"	5/8"	1'-4"	7"	1/2"	1'-4"	9"	1 5/8"	1'-6 1/4"	8"	1 1/2"	2'-2"	.401
305	1'-3"	5/8"	1'-4"	11"	1/2"	1'-4"	1'-1"	2 7/8"	1'-6 1/4"	1'-0"	2"	2'-3"	.521
420	1'-7"	5/8"	1'-4"	1'-3"	1/2"	1'-4"	1'-5"	3 7/8"	1'-6 1/4"	1'-4"	2 7/8"	2'-3"	.677
475	1'-9"	5/8"	1'-4"	1'-5"	1/2"	1'-4"	1'-7"	4 7/8"	1'-6 1/4"	1'-6"	3 7/8"	2'-3"	.844

18" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
225	11"	5/8"	1'-6"	7"	1/2"	1'-6"	9"	1 5/8"	1'-8 1/4"	9"	1 1/2"	2'-4"	.401
285	1'-1"	5/8"	1'-6"	9"	1/2"	1'-6"	11"	2 3/8"	1'-8 1/4"	11"	2"	2'-4"	.479
480	1'-7"	5/8"	1'-6"	1'-3"	1/2"	1'-6"	1'-5"	3 7/8"	1'-8 1/4"	1'-5"	2 7/8"	2'-5"	.677
605	1'-11"	5/8"	1'-6"	1'-7"	1/2"	1'-6"	1'-9"	4 7/8"	1'-8 1/4"	1'-10"	3 7/8"	2'-5"	.844

20" BEARING

CAP. KIPS	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
180	9"	5/8"	1'-8"	5"	1/2"	1'-8"	7"	1 1/8"	1'-10 1/4"	8"	1 1/2"	2'-6"	.360
250	11"	5/8"	1'-8"	7"	1/2"	1'-8"	9"	1 5/8"	1'-10 1/4"	9"	1 1/2"	2'-6"	.401
395	1'-3"	5/8"	1'-8"	11"	1/2"	1'-8"	1'-1"	2 7/8"	1'-10 1/4"	1'-1"	2 3/8"	2'-7"	.552
540	1'-7"	5/8"	1'-8"	1'-3"	1/2"	1'-8"	1'-5"	3 7/8"	1'-10 1/4"	1'-6"	3 7/8"	2'-7"	.760
685	1'-11"	5/8"	1'-8"	1'-7"	1/2"	1'-8"	1'-9"	4 7/8"	1'-10 1/4"	1'-11"	3 7/8"	2'-7"	.844

ANCHOR BOLT NOTES

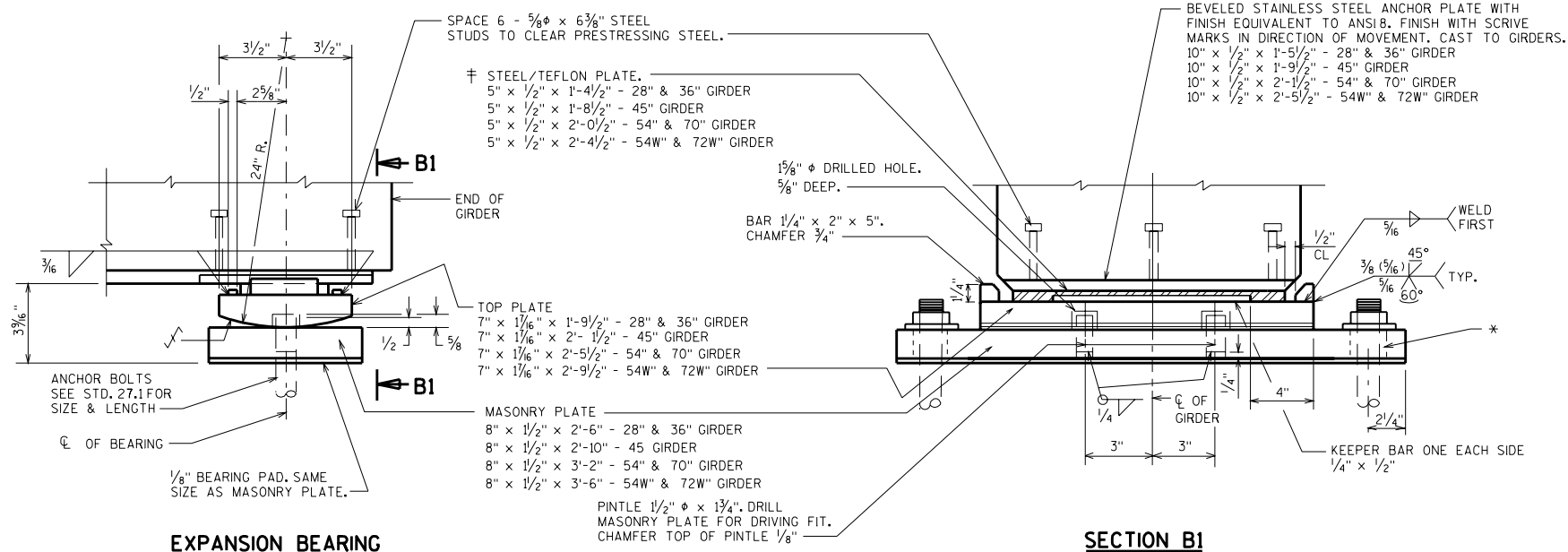
FOR SPAN LENGTHS UP TO 100'-0", USE A TYPE C MASONRY PLATE "D" WITH 2 - 1/4" ⌀ X 1'-5" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 100'-0" UP TO 150'-0", USE A TYPE C MASONRY PLATE "D" WITH 2 - 1 1/2" ⌀ X 1'-10" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS GREATER THAN 150'-0", USE A TYPE II MASONRY PLATE "D" WITH 4 - 1 1/2" ⌀ X 1'-10" LONG ANCHOR BOLTS.

⊕ DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER 3/8" LARGER THAN ANCHOR BOLT.

STAINLESS STEEL - TFE EXPANSION BEARING DETAILS TYPE "A-T"	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/99



∇ TEFLON SURFACE, USE UNFILLED MIN. $\frac{1}{16}$ " THICKNESS. PLACE WITH SCRIBE MARKS IN DIRECTION OF MOVEMENT. BOND STEEL AND TEFLON WITH ADHESIVE MATERIAL MEETING FED. SPEC. MMM-A-134, FEP FILM OR EQUAL. SEE STD. 27.8.

BEARING NOTES

ALL BEARINGS ARE SYMMETRICAL ABOUT ϕ OF GIRDER AND ϕ OF BEARING.

SEE STANDARD 27.2 AND 19.14 FOR CLEARANCE REQUIREMENTS AND STANDARD 27.2 ON WHEN TO BEVEL ROCKERS.

ALL MATERIAL INCLUDING SHIMS, BUT EXCLUDING STAINLESS STEEL PLATE, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

STAINLESS STEEL PLATE SHALL CONFORM TO A.S.T.M. A240, TYPE 304.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

FABRICATOR MAY INCREASE "MASONRY PLATE" THICKNESS AS AN ALTERNATE TO SHIMS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL SURFACES MARKED ∇ SHALL BE MACHINE FINISHED ANSI250 UNLESS OTHERWISE SHOWN.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ALL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 36, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

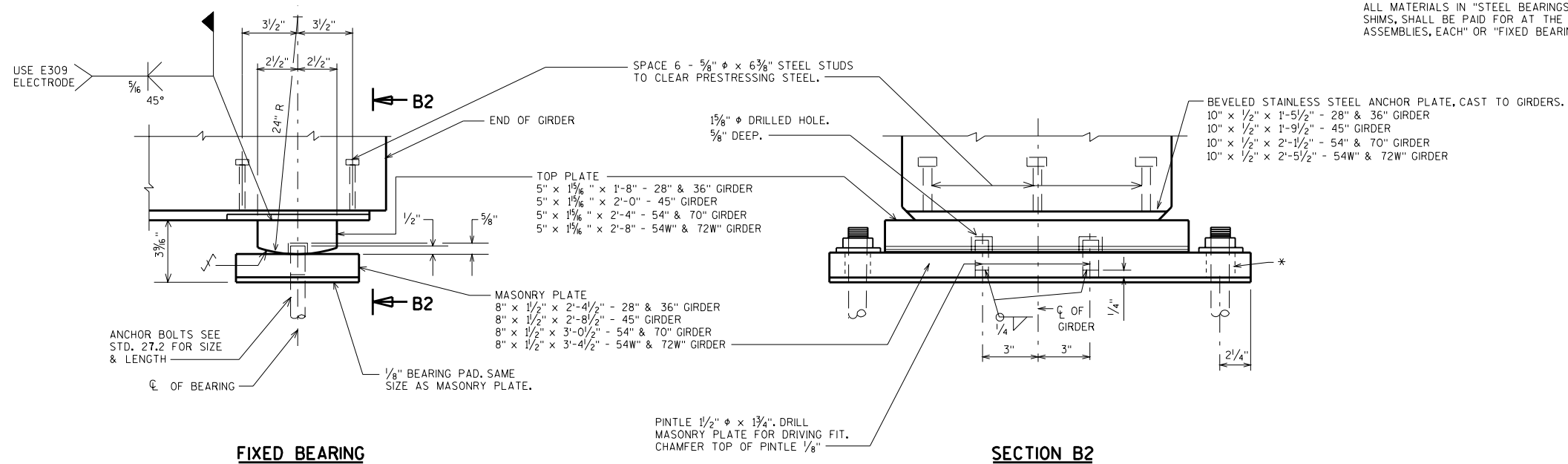
CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

* DRILLED HOLES FOR ANCHOR BOLTS SHALL HAVE A DIAMETER $\frac{3}{8}$ " LARGER THAN ANCHOR BOLT.

MASONRY PLATE, TOP PLATE, KEEPER BARS, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AS REQUIRED BY ASTM DESIGNATION A153, CLASS "C". STEEL PLATE ATTACHED TO TEFLON SURFACE SHALL BE SHOP PAINTED.

ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS "MASONRY PLATE" THICKNESS $+2\frac{1}{4}$ " ABOVE TOP OF CONCRETE.

ALL MATERIALS IN "STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS", INCLUDING SHIMS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR EITHER "EXPANSION BEARING ASSEMBLIES, EACH" OR "FIXED BEARING ASSEMBLIES, EACH".

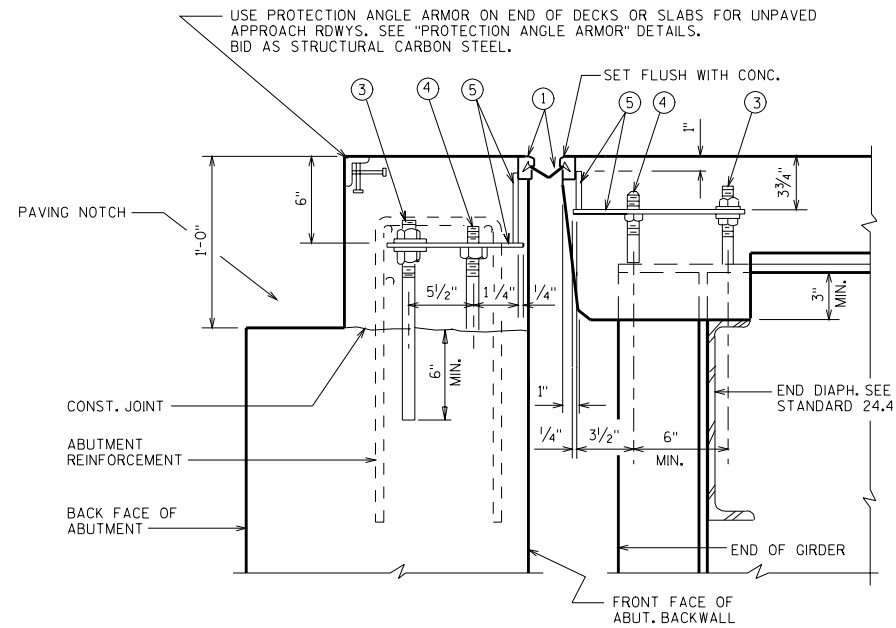


STEEL BEARINGS FOR PRESTRESSED CONCRETE GIRDERS

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

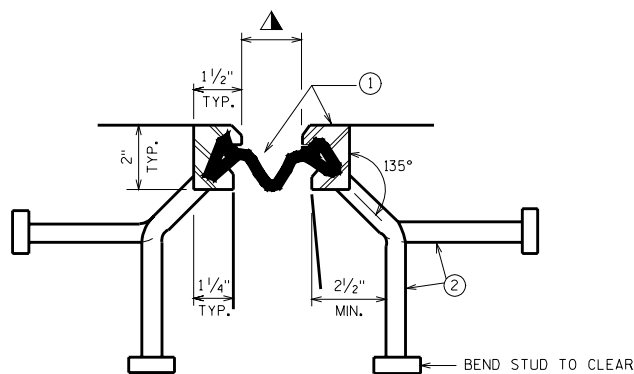
APPROVED: _____

DATE:
 1/03



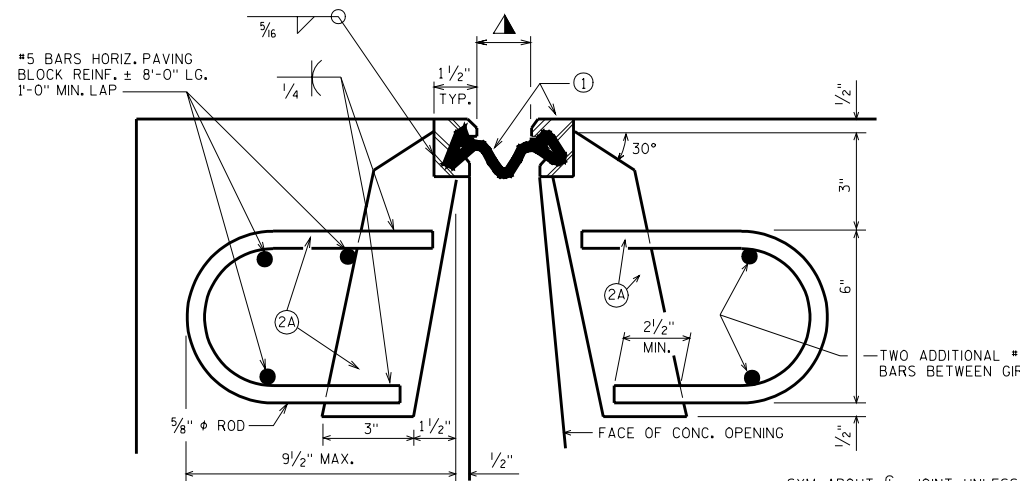
TYPICAL SECTION THRU JOINT AT STEEL GIRDER

NORMAL TO ϕ SUBSTRUCTURE



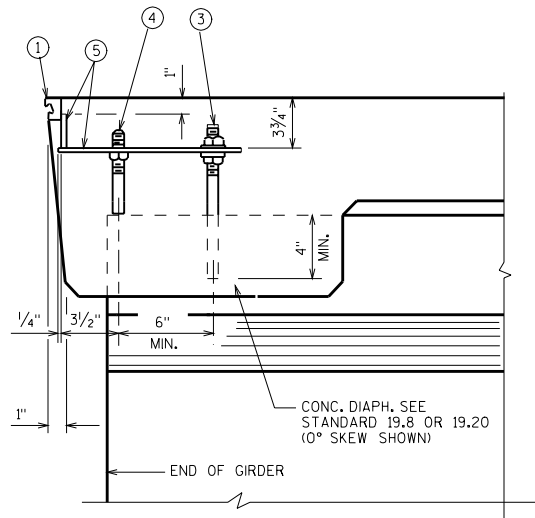
SECTION THRU JOINT

EXTERIOR GIRDER TO EDGE OF SLAB & AT PARAPETS, MEDIANS & SIDEWALKS



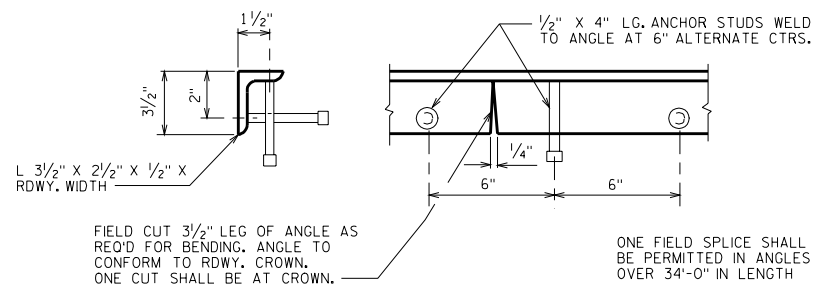
SECTION THRU JOINT

ROADWAY TRAFFIC AREA BETWEEN EXTERIOR GIRDERS.

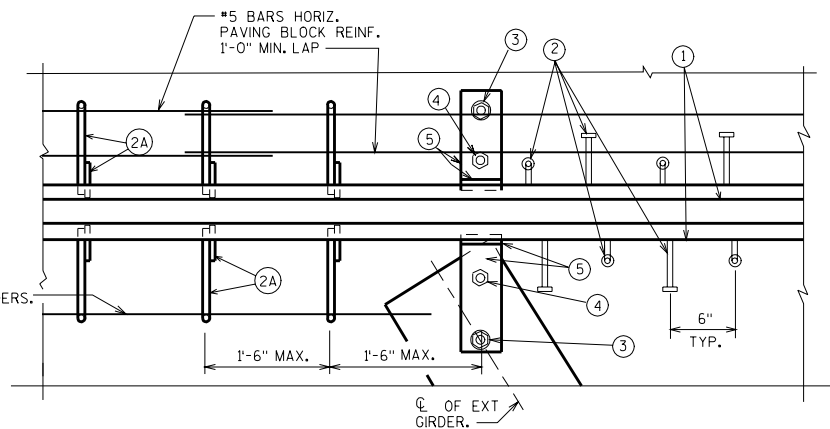


PART SECTION THRU JOINT AT PRESTRESSED GIRDERS

NORMAL TO ϕ SUBSTRUCTURE



PROTECTION ANGLE ARMOR



PART PLAN

LEGEND

- NEOPRENE STRIP SEAL (1-INCH) & STEEL EXTRUSIONS.
▲ SET JOINT OPENING AT 1 3/4" WHEN EXPANSION LENGTH < 230'-0". WHEN EXPANSION LENGTH > 230'-0", PREPARE A TEMPERATURE TABLE SHOWING JOINT OPENINGS AT 85° F, 40° F, & -5° F.
- STUDS 5/8" ϕ X 6 3/4" LONG AT 6" ALTERNATE CENTERS. WELD TO EXTRUSIONS & BEND AS SHOWN AFTER WELDING.
- 2A. 1/2" THICK ANCHOR PLATE WITH 5/8" ϕ ROD (OR ALTERNATE STRIP SEAL ANCHOR). WELD ROD TO ANCHOR PLATE, WELD ANCHOR PL. TO NO. 1 AT 1'-6" CTRS. BETWEEN GIRDERS.
- 3/4" ϕ THREADED ROD WITH 2 NUTS AND WASHERS. FOR PRESTRESSED GIRDERS FIELD SET ON ϕ OF GIRDER. FOR STEEL GIRDERS WELD THREADED ROD TO TOP FLANGE OR ATTACH BY BOLTING THRU FLANGE. ON ABUTMENT SIDE GROUT THREADED ROD INTO FIELD DRILLED HOLES IN ABUTMENT BACKWALL AS SHOWN.
- 3/4" ϕ THREADED ROD WITH NUT. TACK WELD NUT TO NO. 5.
- FABRICATE SUPPORT FROM 3" X 1/2" BAR AS SHOWN OR EQUIVALENT. ONE PER GIRDER PER SIDE. SHOP OR FIELD WELD TO NO. 1. IF FIELD WELDED, COVER WELDED AREAS WITH EPOXY-COATING MATERIAL. PROVIDE 1 1/2" ϕ HOLE FOR NO. 3 & 1" ϕ HOLE FOR NO. 4.
- GALVANIZED PLATE 3/8" X 10 1/2" X (2'-0" LONG FOR SKEWS 10° TO 45° & 3'-0" LONG FOR SKEWS > 45°) WITH HOLES FOR NO. 7. BEND AS SHOWN.
- 3/4" ϕ X 1 1/2" STAINLESS STEEL SOCKET FLAT HEAD SCREWS WITH ANTI-SEIZE LUBRICANT. RECESS 1/16" BELOW PLATE SURFACE.
- 3/4" ϕ X 4" GALVANIZED HEX HEAD BOLT. BEND 45°.
- 3/4" ϕ X 2 1/4" GALVANIZED THREADED COUPLING.
- GALVANIZED SIDEWALK PLATE 3/8" X (2'-0" WIDE FOR SKEWS TO 45° & 3'-0" WIDE FOR SKEWS > 45°) X LIMITS SHOWN. BEND DOWN FACE OF SIDEWALK WITH HOLES FOR NO. 7.
- 1" X 5" SLOTTED CSK. HOLE FOR NO. 7. SLOT PARALLEL TO DIRECTION OF MOVEMENT.

REFER TO STANDARD 28.2

NOTES

ONE FIELD SPLICE PERMITTED IN STEEL EXTRUSIONS. IF USED, DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO SPLICING PERMITTED IN NEOPRENE STRIP SEAL.

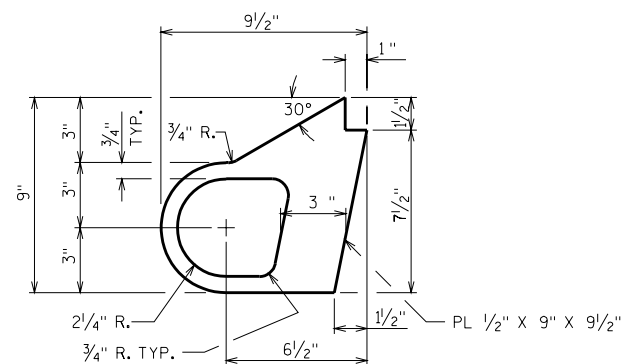
AFTER FABRICATION, BUT BEFORE SHIPMENT, STRAIGHTEN STEEL EXTRUSIONS SUCH THAT THEY SHALL BE FREE FROM WARP, TWIST & SWEEP.

FABRICATOR SHALL PROVIDE MEANS OF KEEPING GALVANIZED EXTRUSIONS CLEAN & SMOOTH DURING SHIPMENT AND PRIOR TO APPLYING LUBRICANT ADHESIVE FOR NEOPRENE GLAND INSTALLATION.

SANDBLAST PLATES & EXTRUSIONS AFTER FABRICATION IN ACCORDANCE WITH SSPC SP. #6 "COMMERCIAL BLAST CLEANING". AFTER BLAST CLEANING, THE PLATES & EXTRUSIONS SHALL BE HOT DIPPED GALVANIZED.

ANCHOR SYSTEM NO. 8 & NO. 9 SHALL CONFORM TO ASTM A307 & SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C & D.

STRIP SEAL EXPANSION JOINT ASSEMBLY, INCLUDING ANCHOR STUDS & HARDWARE WILL BE PAID FOR AT THE LUMP SUM PRICE BID FOR "EXPANSION DEVICE".



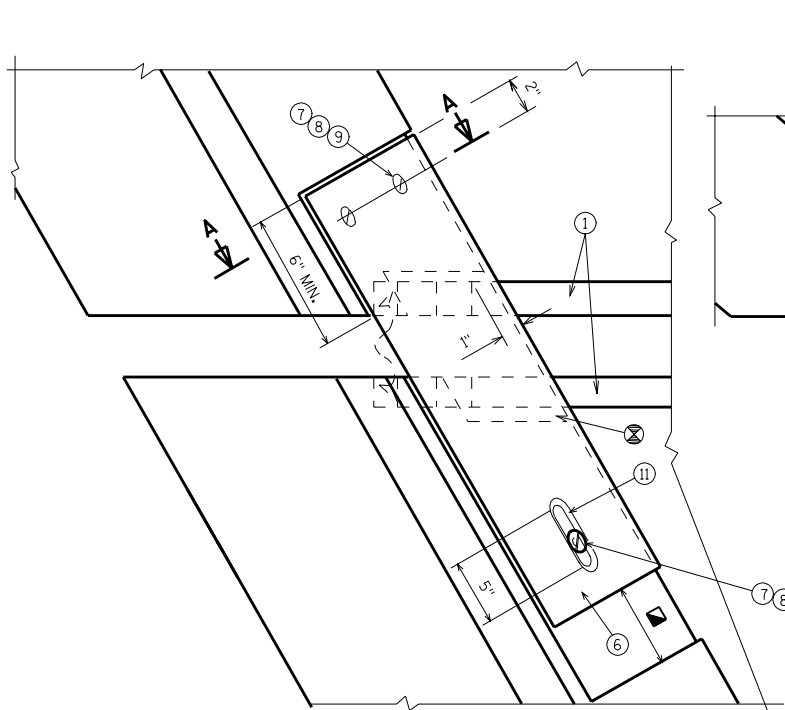
ALTERNATE STRIP SEAL ANCHOR

STRIP SEAL EXPANSION JOINT DETAILS

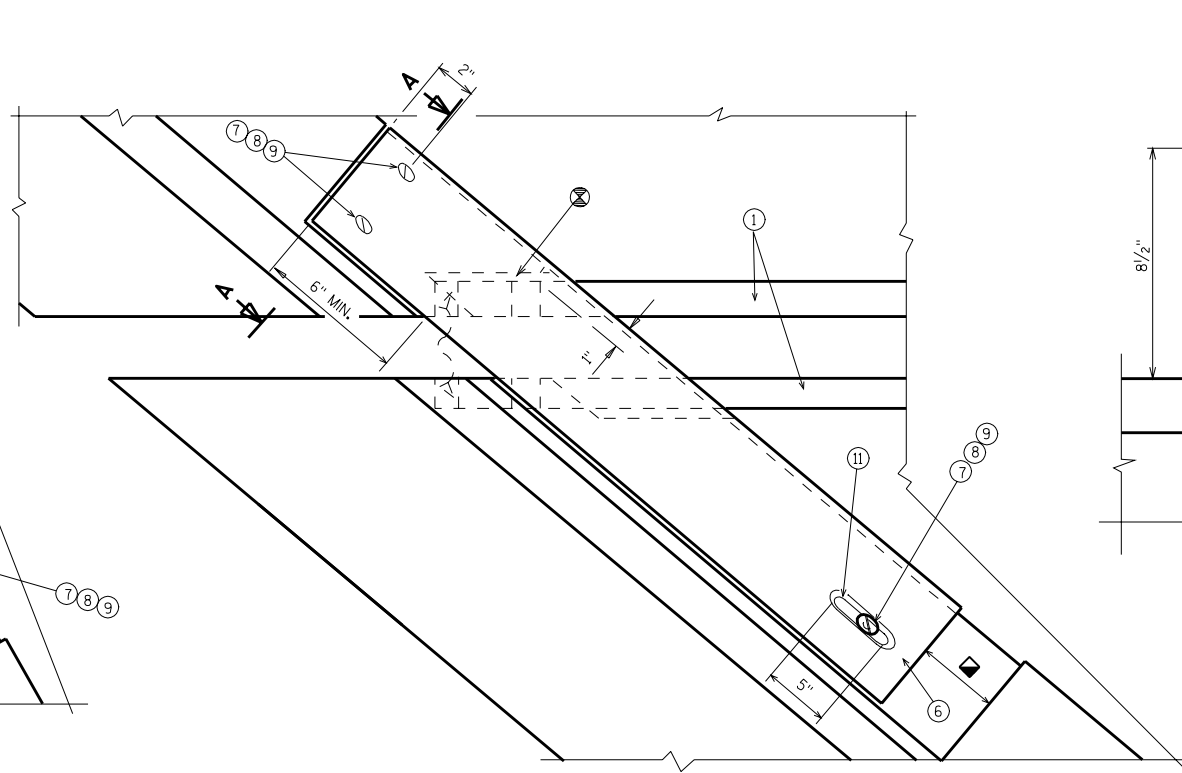
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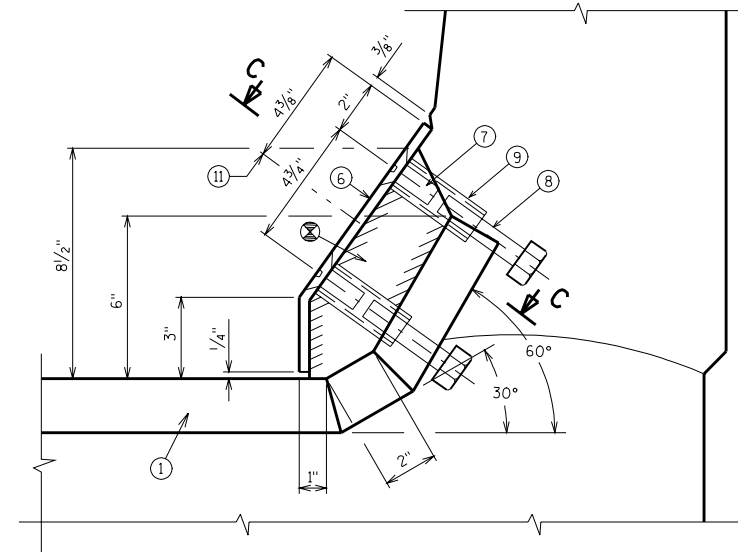
DATE:
1-02



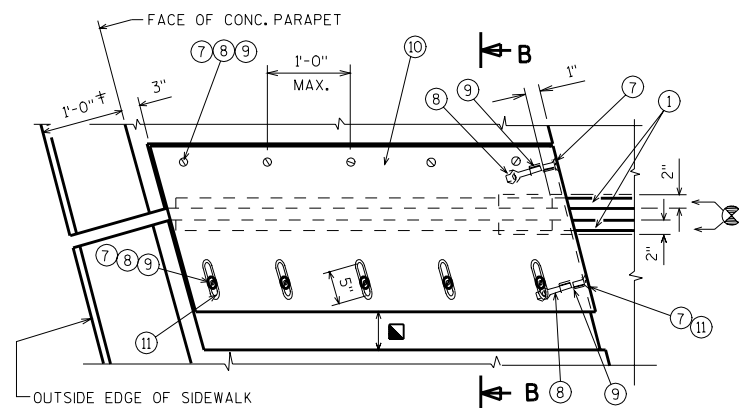
PLAN 10° ≤ 30° SKEWS
(ITEMS 6 THRU 9 NOT REQ'D FOR SKEWS < 10°)



PLAN > 30° SKEWS

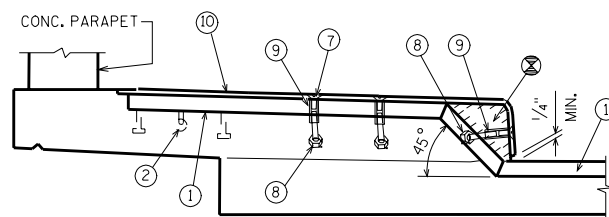


SECTION A-A



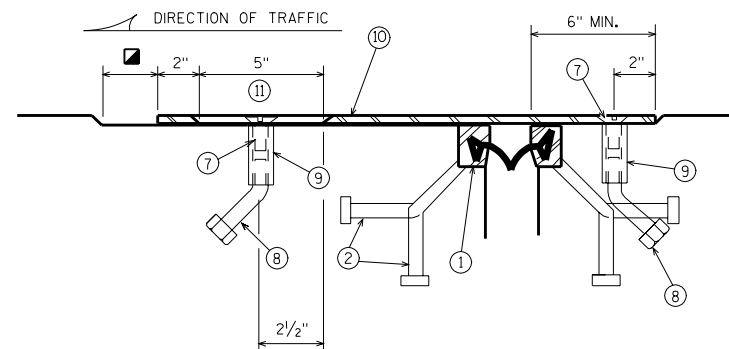
PLAN AT SIDEWALK

± 1'-2" WHEN "VERTICAL FACE PARAPET TYPE 'TX' IS USED

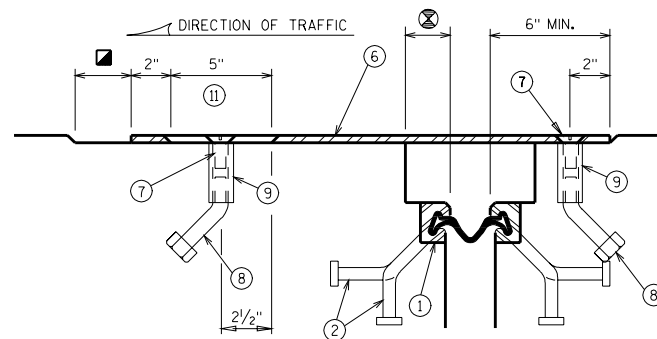


SECTION AT SIDEWALK

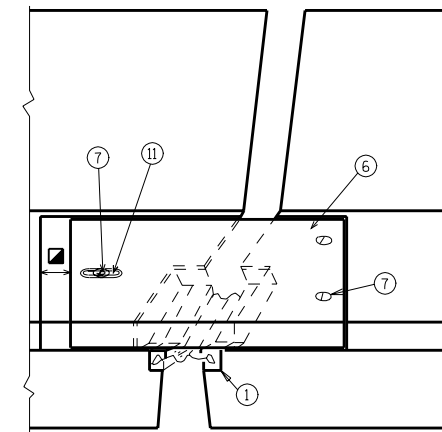
NOTE: COVER PLATE REQ'D FOR ALL SIDEWALKS



SECTION B-B



SECTION C-C



**VIEW OF PARAPET PLATES
FROM ROADWAY**

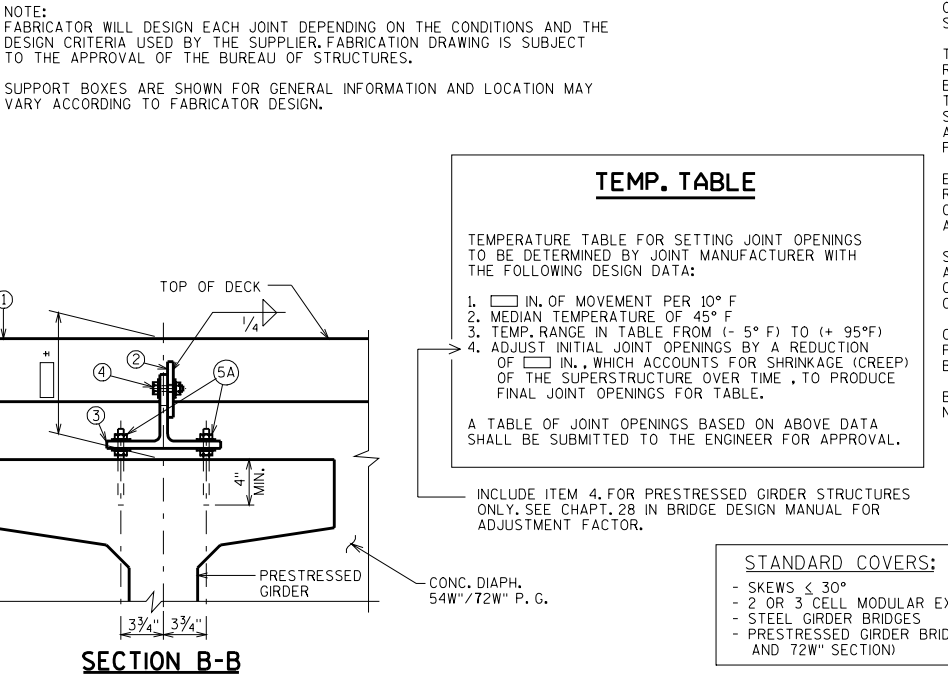
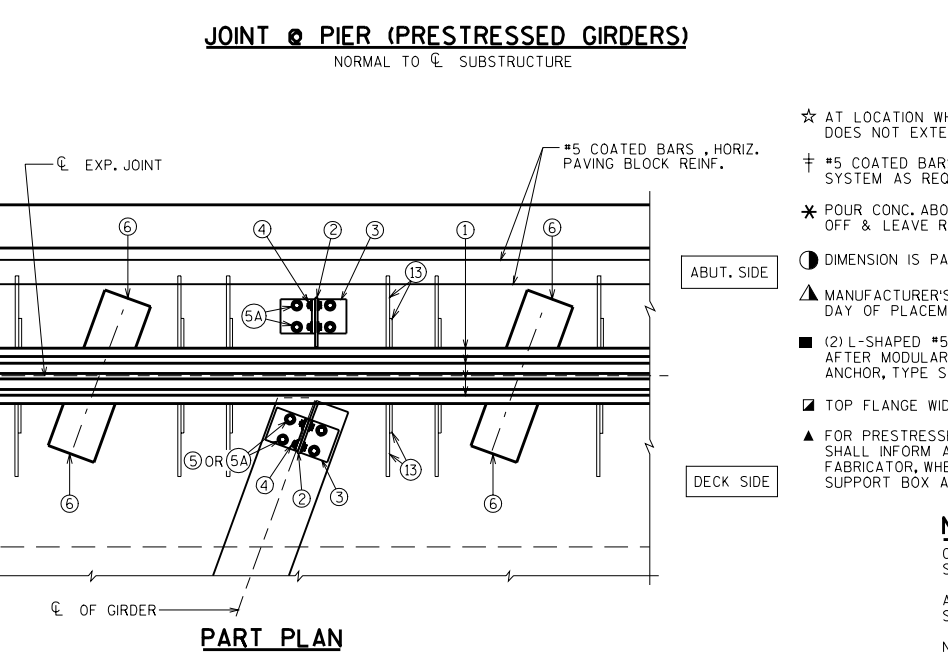
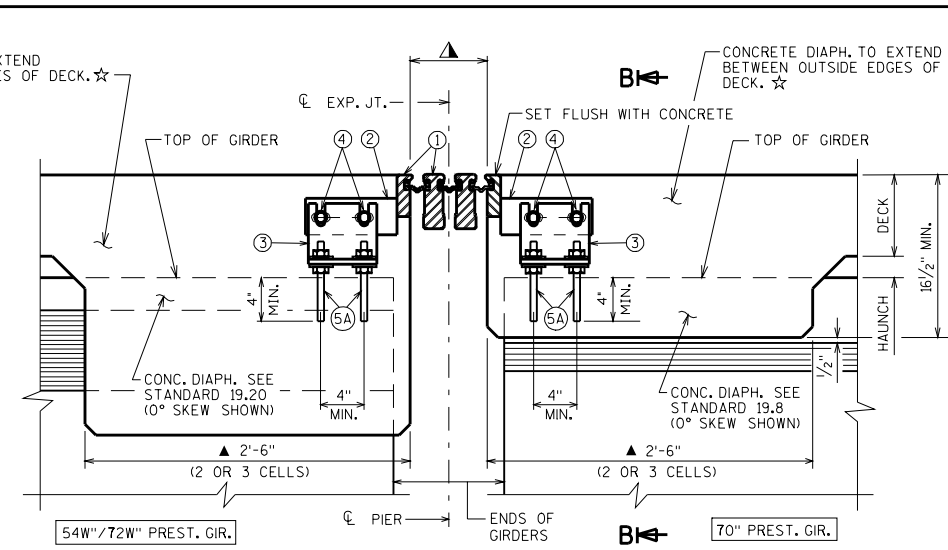
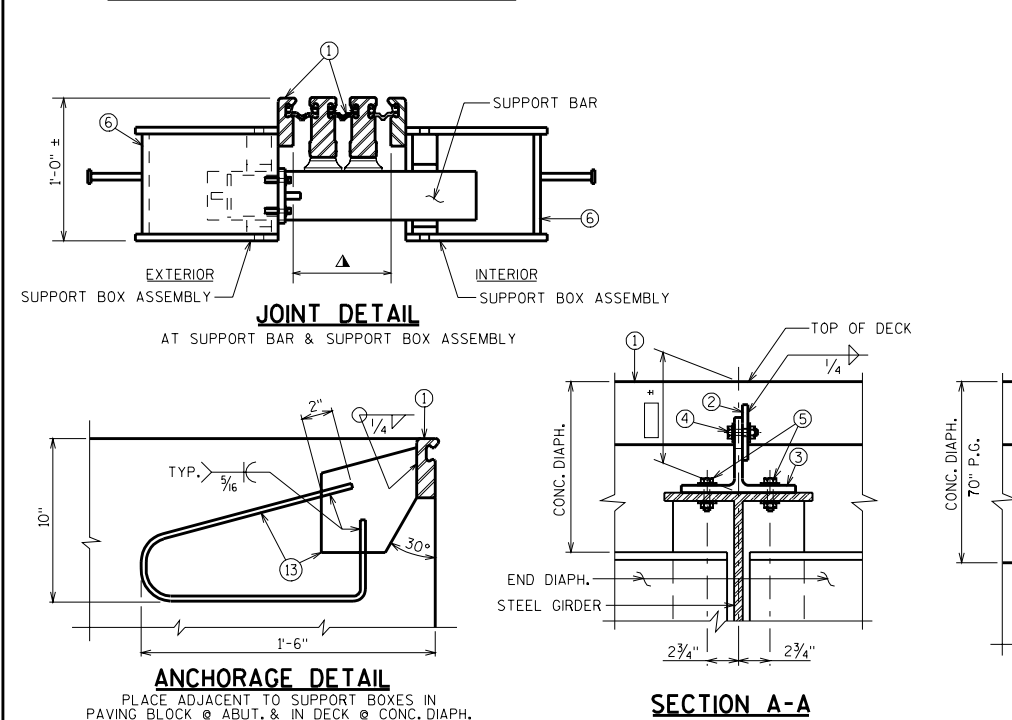
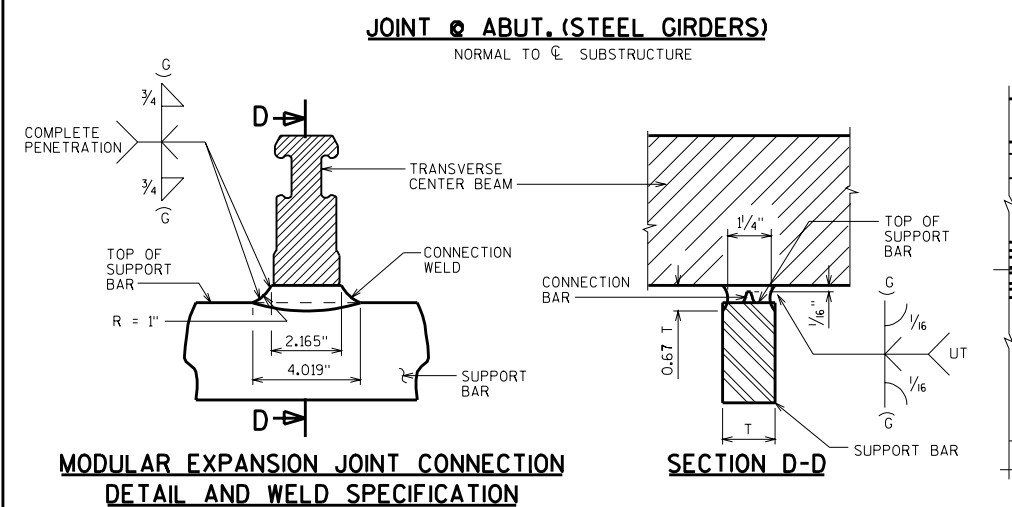
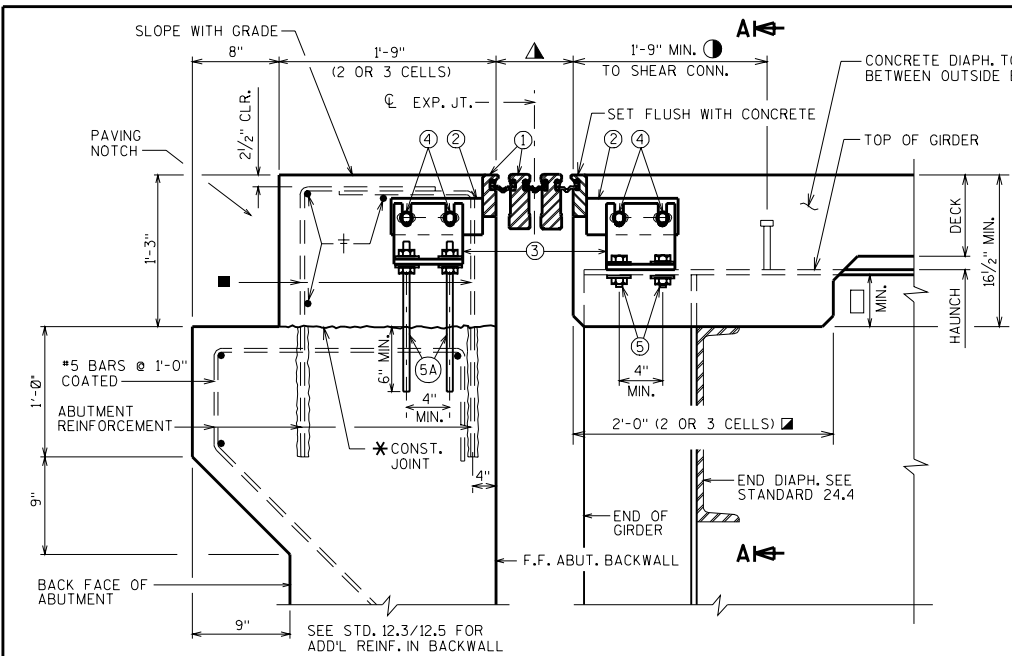
- ⊗ BLOCK OUT CONCRETE 2" EACH SIDE FOR JOINT OPENING
- JOINT OPENING DIM. ALONG SKEW PLUS 1/2"

**STRIP SEAL COVER
PLATE DETAILS**

STATE OF WISCONSIN
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- LEGEND**
- MODULAR EXPANSION JOINT DEVICE.
 - $\frac{1}{2}$ " PLATE, ONE PER GIRDER MIN. PROVIDE 2 - 1" X 2" MIN. SLOTTED HOLES PLACED HORIZONTALLY FOR NO. 4.
 - WT 6 X 29 (OR EQUIVALENT BUILT UP T-SECTION), ONE PER GIRDER, PROVIDE 2 - 1" X 3" MIN. SLOTTED HOLES PLACED VERTICALLY IN WEB OF WT FOR BOLTS NO. 4.
 - $\frac{3}{4}$ " ϕ HIGH STRENGTH BOLTS WITH NUTS & WASHERS. (A325 GALV.)
 - $\frac{3}{4}$ " ϕ HIGH STRENGTH BOLTS WITH NUTS & WASHERS. FIELD DRILL HOLES IN GIRDER TOP FLANGE. (A325 GALV.)
 - $\frac{3}{4}$ " ϕ THREADED ROD WITH 2 NUTS & WASHERS. GROUT THREADED ROD INTO FIELD DRILLED HOLES. (GALV.)
 - SUPPORT BOX ASSEMBLY FOR SUPPORT BAR (SPA, PER MANUFACTURER). SPACE TO MISS GIRDERS. FABRICATE BOX FROM $\frac{1}{2}$ " PLATES.
 - $\frac{3}{8}$ " BULKHEAD PLATE. WELD TO NO. 1, NO. 8 AND NO. 14.
 - INSIDE PLATE. FABRICATE FROM $\frac{3}{8}$ " PLATE.
 - OUTSIDE PLATE. FABRICATE FROM $\frac{5}{8}$ " PLATE.
 - $\frac{7}{8}$ " SQUARE BAR. WELD TO NO. 8 AS SHOWN.
 - $\frac{3}{4}$ " ϕ X 4" LONG STUDS. WELD TO NO. 8, NO. 7 & NO. 14 AS SHOWN.
 - $\frac{3}{4}$ " ϕ X 2" STAINLESS STEEL FLAT CTSK. SLOTTED HEAD CAP SCREWS. RECESS $\frac{1}{16}$ " BELOW PLATE SURFACE.
 - $\frac{1}{2}$ " PLATE WITH $\frac{5}{8}$ " ϕ LOOP ANCHOR FABRICATED AS SHOWN. SPACED AT MANUFACTURER'S SPEC.
 - INSIDE PLATE. FABRICATE FROM $\frac{5}{8}$ " PLATE
 - ADIPRENE BUTTON. SEE DETAIL. SET IN OUTSIDE PLATE.

- ★ AT LOCATION WHERE EXT. GIR. IS ADJACENT TO A RAISED SIDEWALK (STD. 30.7), CONC. DIAPH. DOES NOT EXTEND OUT TO EDGE OF DECK, BUT IS TERMINATED AT INSIDE FACE OF EXT. GIR.
- † #5 COATED BARS. \pm 8'-0" LONG, 1'-0" MIN. LAP. CUT IN FIELD TO CLEAR JOINT SUPPORT SYSTEM AS REQ'D.
- ✱ POUR CONC. ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONC. IS IN PLACE. STRIKE OFF & LEAVE ROUGH.
- ① DIMENSION IS PARALLEL TO ∇ GIRDER.
- ▲ MANUFACTURER'S RECOMMENDED JOINT OPENING BASED ON THE TEMPERATURE ON THE DAY OF PLACEMENT PER TEMPERATURE TABLE.
- (2) L-SHAPED #5 BARS @ 1'-0" SPA. (COATED) ANCHOR INTO PLACE W/ EPOXY RESIN AFTER MODULAR JOINT IS IN POSITION. FOLLOW STD. SPEC. FOR CONCRETE MASONRY ANCHOR, TYPE S WITH A MIN. PULLOUT CAPACITY OF 20 KIPS AND EMBEDMT OF 1'-0".
- ☑ TOP FLANGE WIDTH WITHIN LIMITS OF CONC. DIAPH. SHALL BE \leq 20" FOR SKEWS \leq 30°
- ▲ FOR PRESTRESSED GIRDERS, PLACE THE FOLLOWING NOTE ON PLANS: "JOINT MANUFACTURER SHALL INFORM AND PROVIDE NECESSARY DETAILS TO THE PRESTRESSED GIRDER FABRICATOR, WHEN FORM-OUT OF THE TOP FLANGE IS REQ'D. TO ALLOW PLACEMENT OF SUPPORT BOX ASSEMBLY."

NOTES

ONE FIELD SPLICE PERMITTED IN STEEL EXTRUSIONS. DETAILS SHALL BE SUBMITTED FOR APPROVAL. NO SPLICING PERMITTED IN NEOPRENE GLAND.

AFTER FABRICATION, BUT BEFORE SHIPMENT, STRAIGHTEN STEEL EXTRUSIONS SUCH THAT THEY SHALL BE FREE FROM WARP, TWIST & SWEEP.

NO EXPANSION JOINT PROTRUSIONS PERMITTED ABOVE ROADWAY SURFACE, ON PARAPET ROADWAY FACE OR ABOVE SIDEWALK SURFACE (FOR RAISED SIDEWALK).

THE EXPANSION JOINT SEALS SHALL BE PLACED, BONDED & SEALED AS RECOMMENDED BY THE MANUFACTURER. FORM WORK SHALL BE PLACED BETWEEN THE SUPPORT BOXES TO PREVENT CONCRETE INTRUSION INTO THE SUPPORT BOX. A TECHNICAL REPRESENTATIVE OF THE MANUFACTURER SHALL BE PRESENT DURING INSTALLATION. PRIOR TO SETTING THE JOINT ASSEMBLY INTO POSITION, THE PROJECT ENGINEER SHALL DETERMINE THE PROPER JOINT OPENING.

EXPANSION JOINT EXTRUSIONS SHALL BE FABRICATED TO CONFORM TO ROADWAY CROWN & GRADE. FABRICATOR SHALL PROVIDE MEANS OF KEEPING GALVANIZED EXTRUSIONS CLEAN & SMOOTH DURING SHIPMENT AND PRIOR TO APPLYING LUBRICANT ADHESIVE FOR NEOPRENE GLAND INSTALLATION.

SANDBLAST BARS, PLATES, WT-SECTION, ANCHORAGE LOOP, & EXTRUSIONS AFTER FABRICATION IN ACCORDANCE WITH SSPC SP. #6 "COMMERCIAL BLAST CLEANING". AFTER BLAST CLEANING, THIS ASSEMBLY SHALL BE HOT DIPPED GALVANIZED.

COST OF FURNISHING & PLACING OF THE EXPANSION JOINTS COMPLETE WITH PARAPET PLATES & SIDEWALK PLATES SHALL BE PAID FOR UNDER THE PRICE BID FOR "MODULAR EXPANSION DEVICE, STRUCTURE B - -".

BAR STEEL REINF. IN DECK AND CONC. DIAPHRAGM SHALL BE RESPAVED AS NECESSARY TO ALLOW PLACEMENT OF JOINT ASSEMBLY.

TEMP. TABLE

TEMPERATURE TABLE FOR SETTING JOINT OPENINGS TO BE DETERMINED BY JOINT MANUFACTURER WITH THE FOLLOWING DESIGN DATA:

1. \square IN. OF MOVEMENT PER 10° F
2. MEDIAN TEMPERATURE OF 45° F
3. TEMP. RANGE IN TABLE FROM (- 5° F) TO (+ 95° F)
4. ADJUST INITIAL JOINT OPENINGS BY A REDUCTION OF \square IN., WHICH ACCOUNTS FOR SHRINKAGE (CREEP) OF THE SUPERSTRUCTURE OVER TIME, TO PRODUCE FINAL JOINT OPENINGS FOR TABLE.

A TABLE OF JOINT OPENINGS BASED ON ABOVE DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

INCLUDE ITEM 4. FOR PRESTRESSED GIRDER STRUCTURES ONLY. SEE CHAPT. 28 IN BRIDGE DESIGN MANUAL FOR ADJUSTMENT FACTOR.

CONC. DIAPH. 54W"/72W" P. G.

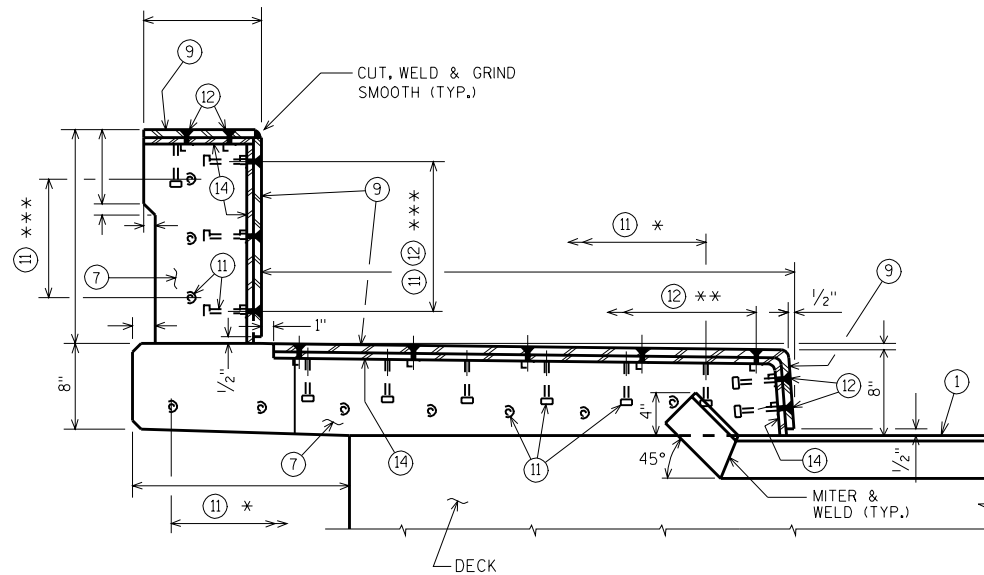
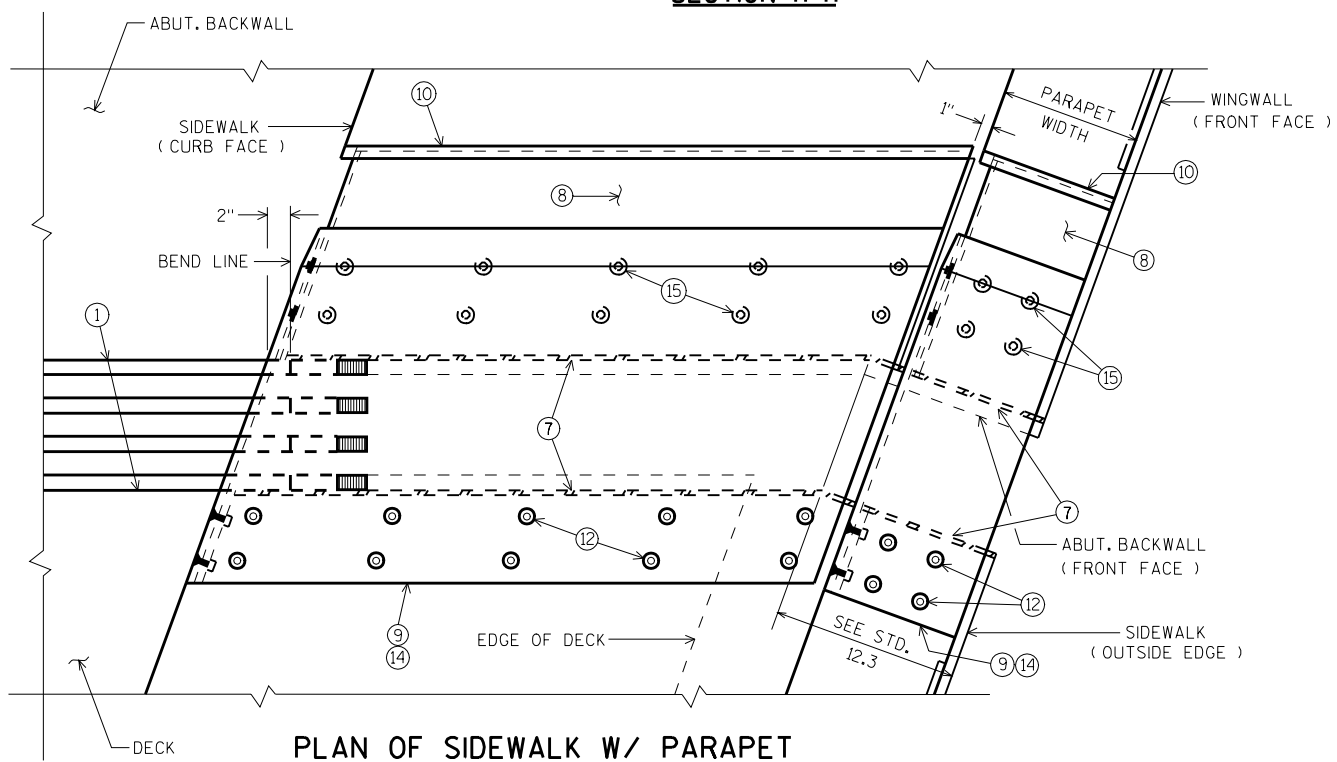
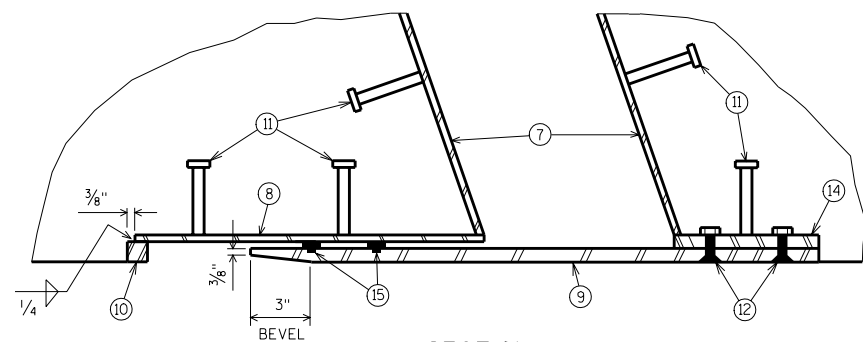
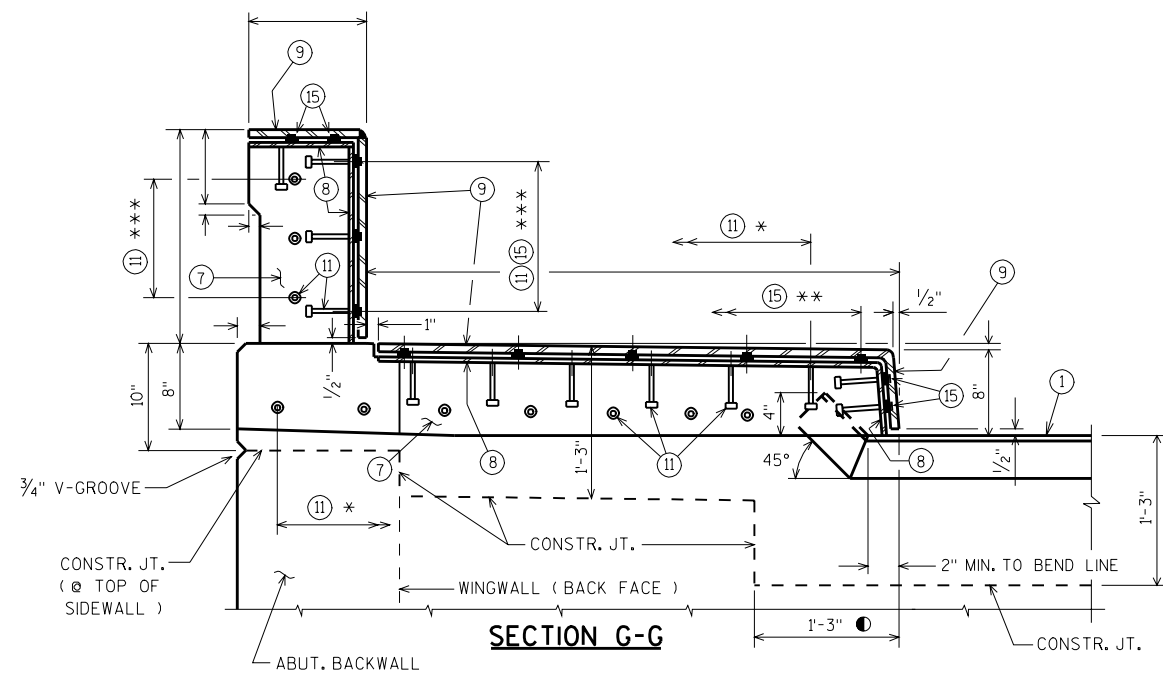
STANDARD COVERS:

- SKEWS \leq 30°
- 2 OR 3 CELL MODULAR EXPANSION JOINTS
- STEEL GIRDER BRIDGES
- PRESTRESSED GIRDER BRIDGES (70", 54W" AND 72W" SECTION)

MODULAR EXPANSION JOINT DETAILS

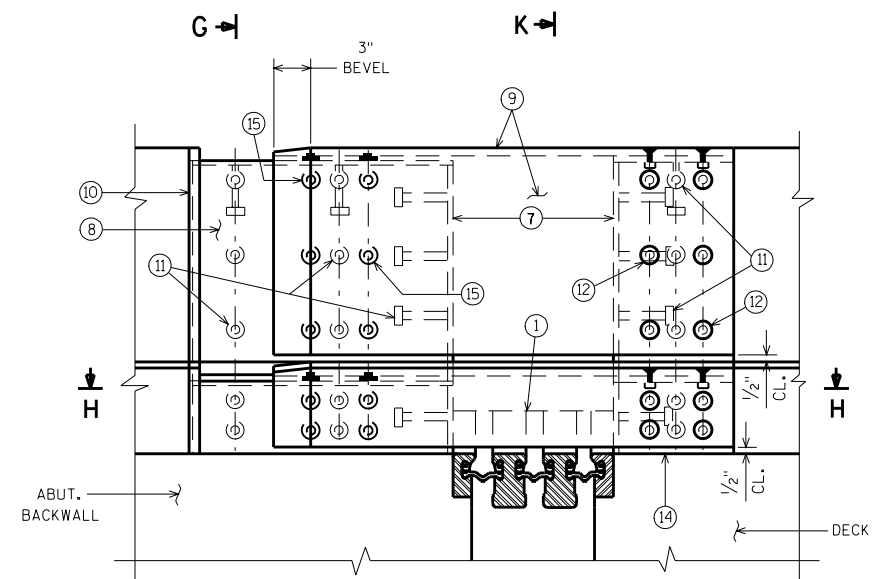
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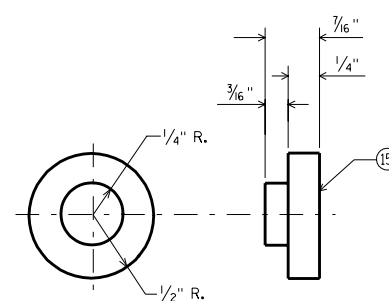
SECTION K-K

- * 6" MAX. SPA.
- ** 1'-0" MAX. SPA.
- *** 2 SPA. (1'-8" PARA. HEIGHT)
4 SPA. (2'-8" PARA. HEIGHT)
- PERPENDICULAR TO FACE OF CURB



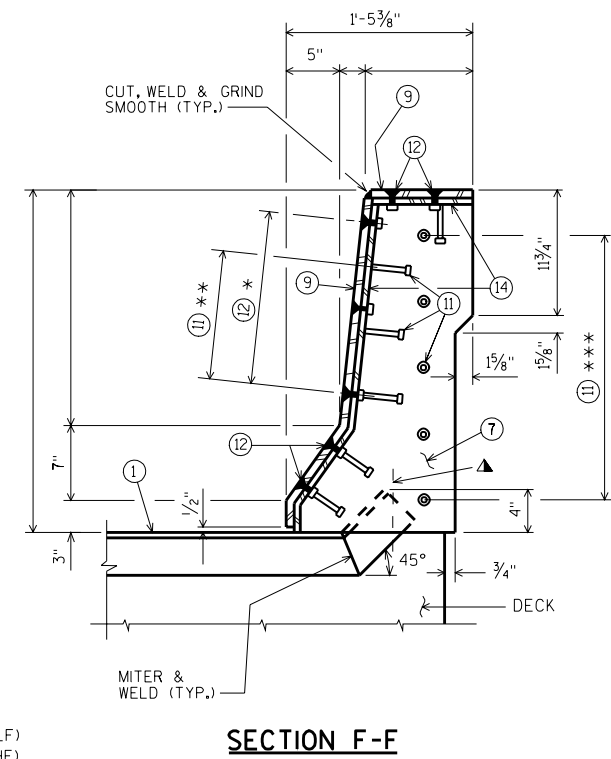
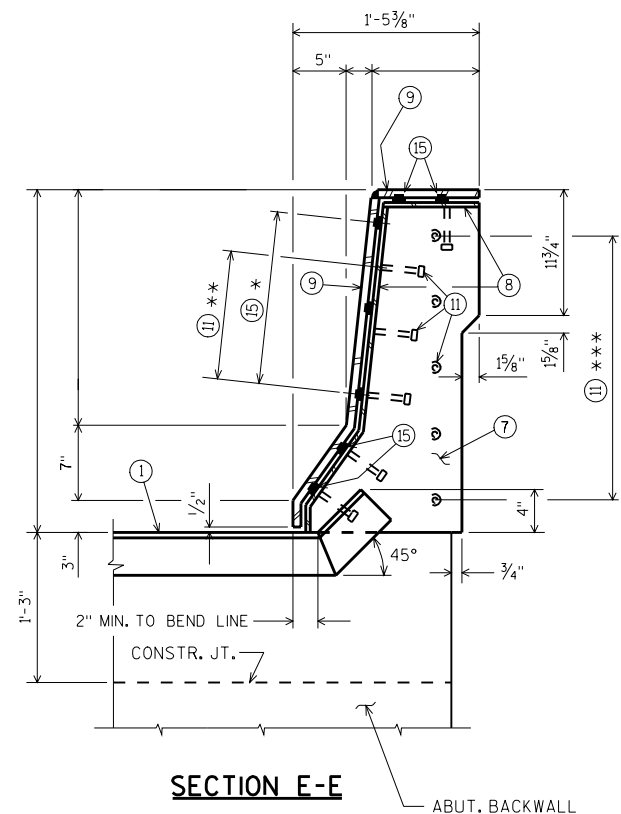
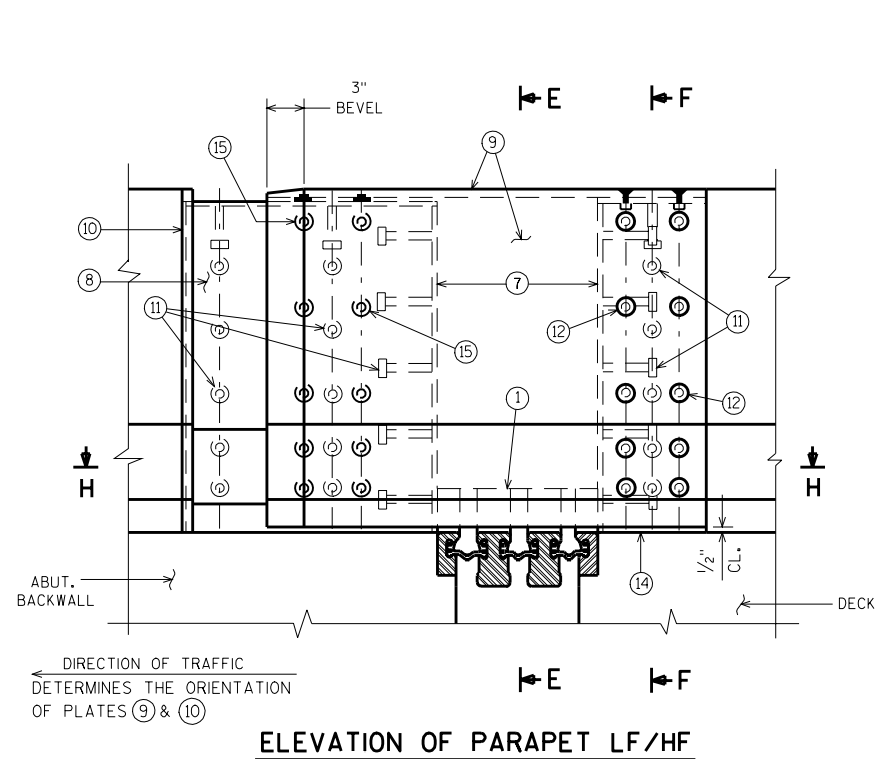
ELEVATION OF SIDEWALK W/ PARAPET

← DIRECTION OF TRAFFIC
DETERMINES THE ORIENTATION
OF PLATES 9 & 10

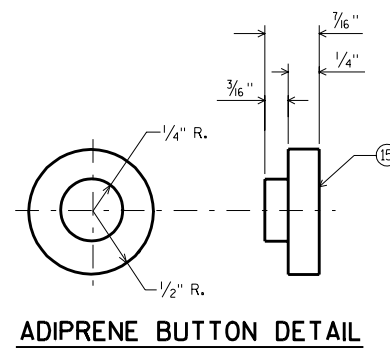
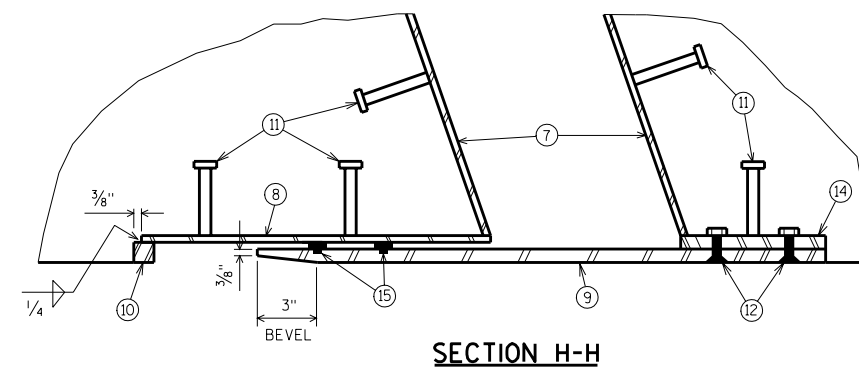
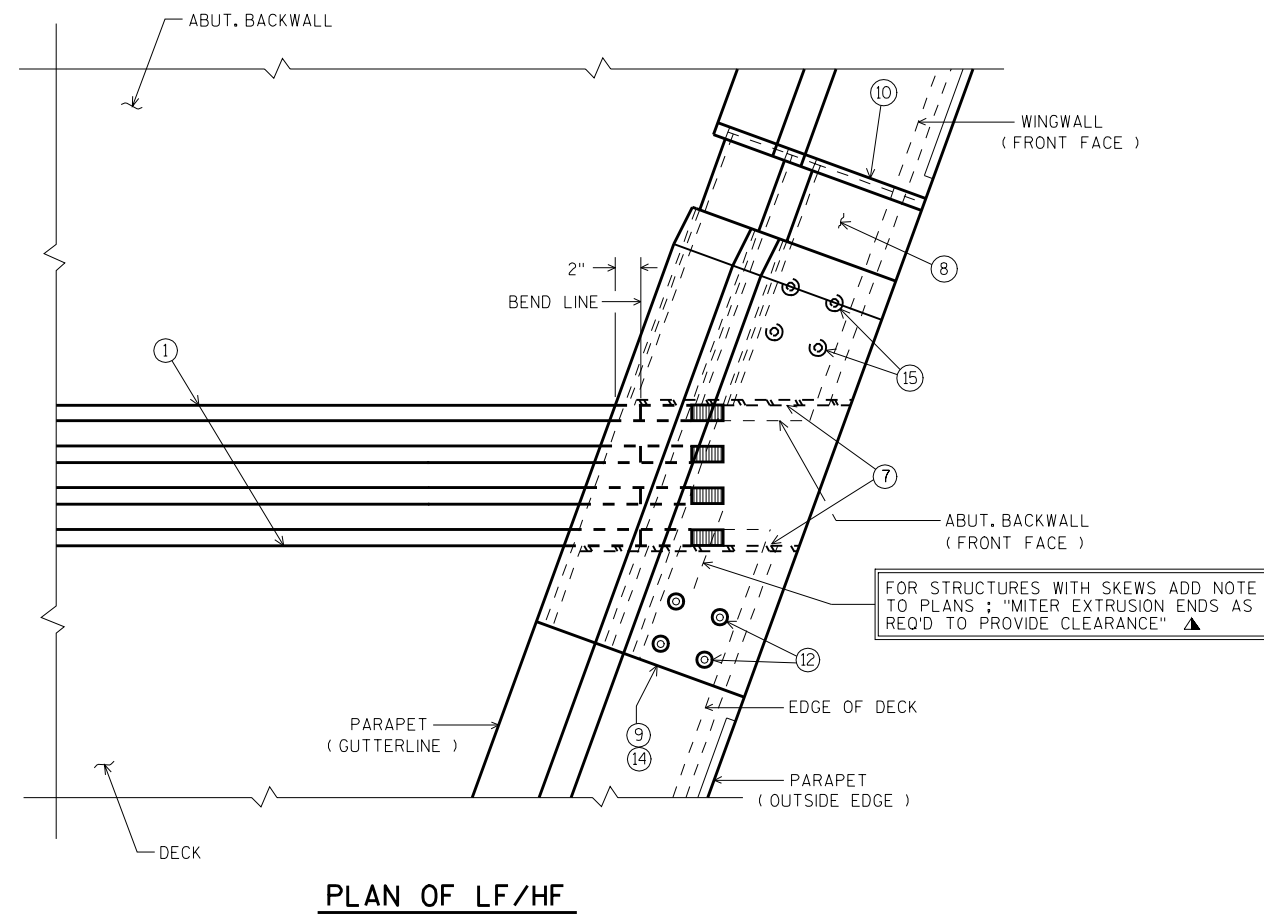


ADIPRENE BUTTON DETAIL

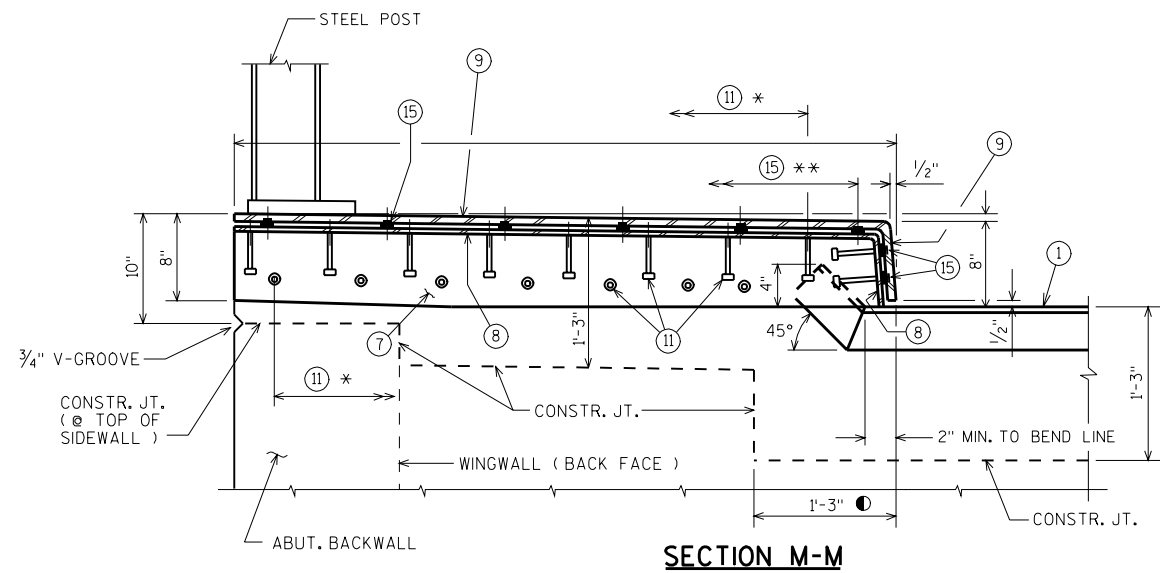
COVER PLATES FOR SIDEWALK W/ CONC. PARA.	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1-02



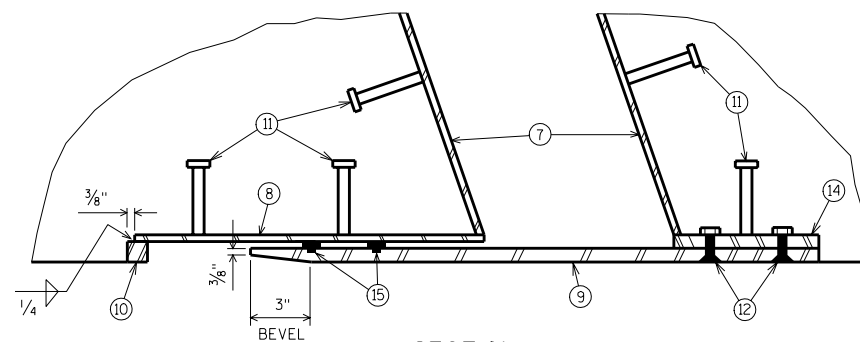
- * 2 EQ. SPA. (LF)
4 EQ. SPA. (HF)
- ** 2 SPA. (LF)
4 SPA. (HF)
- *** 4 SPA. (LF)
6 SPA. (HF)



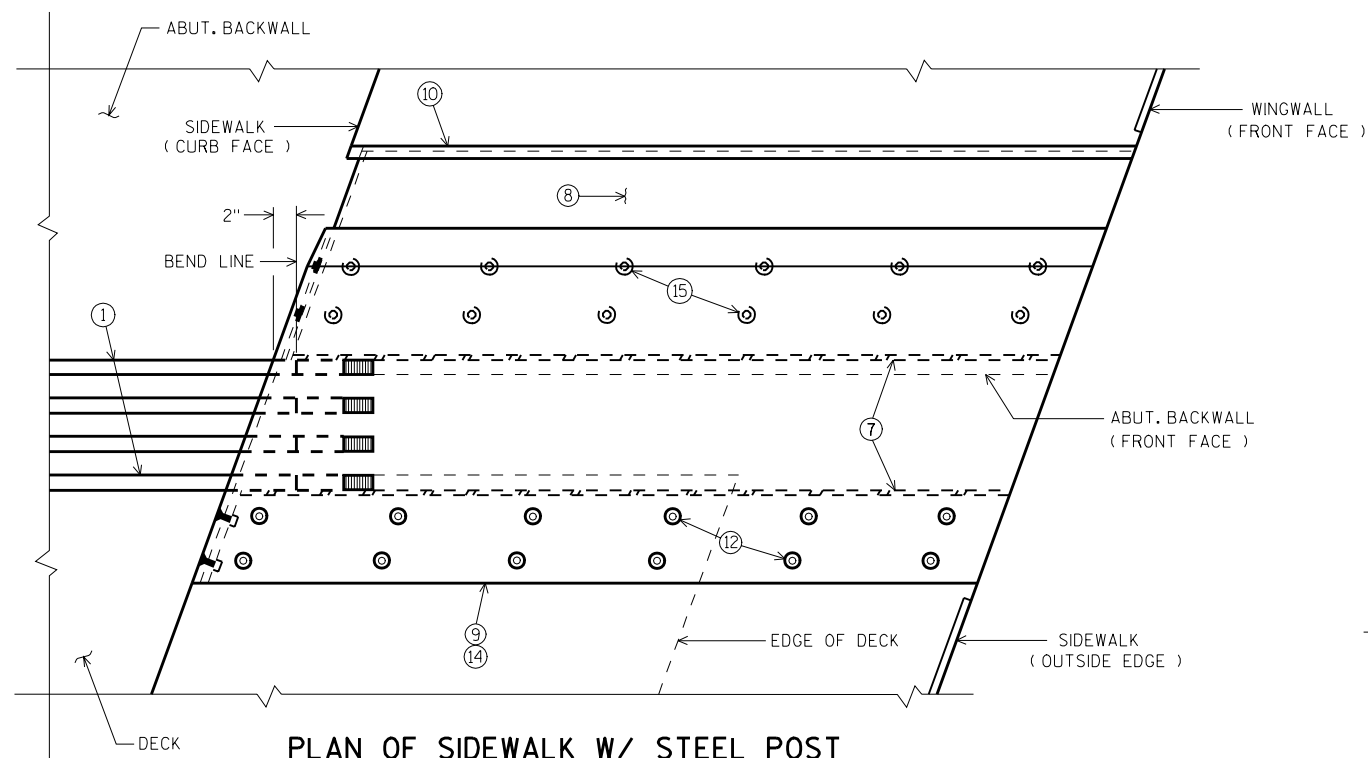
COVER PLATES FOR PARAPET 'LF/HF'	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1-02



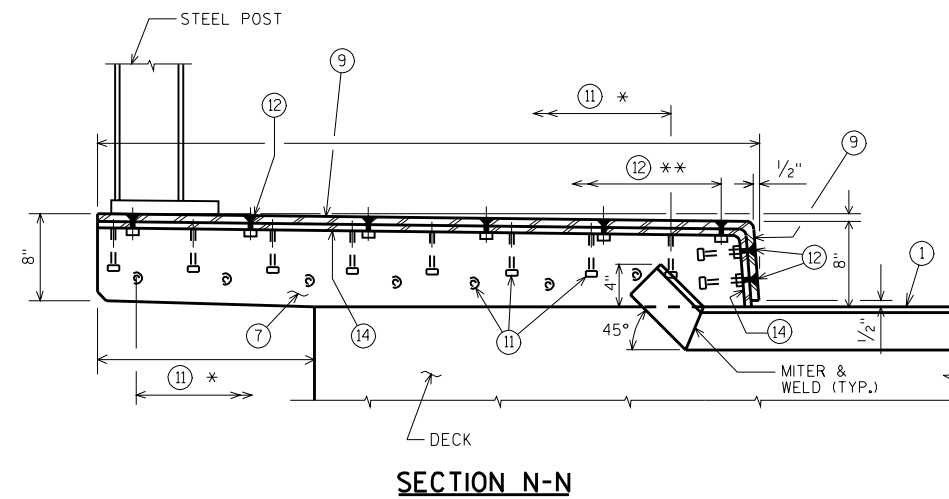
SECTION M-M



SECTION H-H

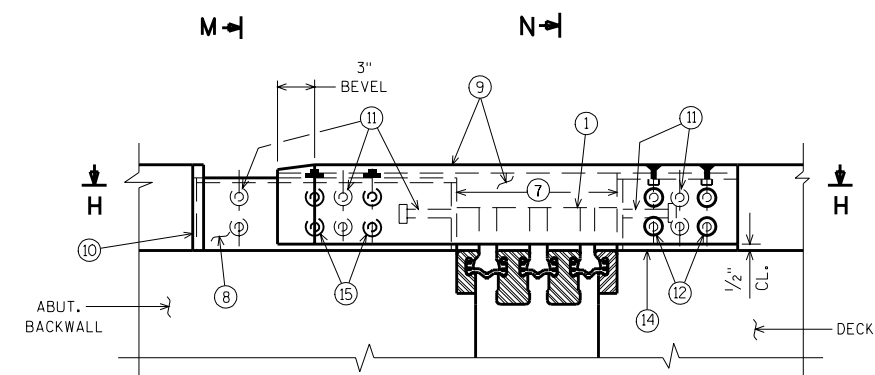


PLAN OF SIDEWALK W/ STEEL POST

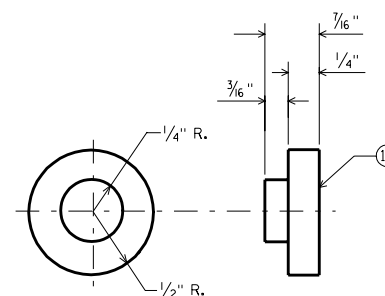


SECTION N-N

- * 6" MAX. SPA.
- ** 1'-0" MAX. SPA.
- PERPENDICULAR TO FACE OF CURB



ELEVATION OF SIDEWALK W/ STEEL POST



ADIPRENE BUTTON DETAIL

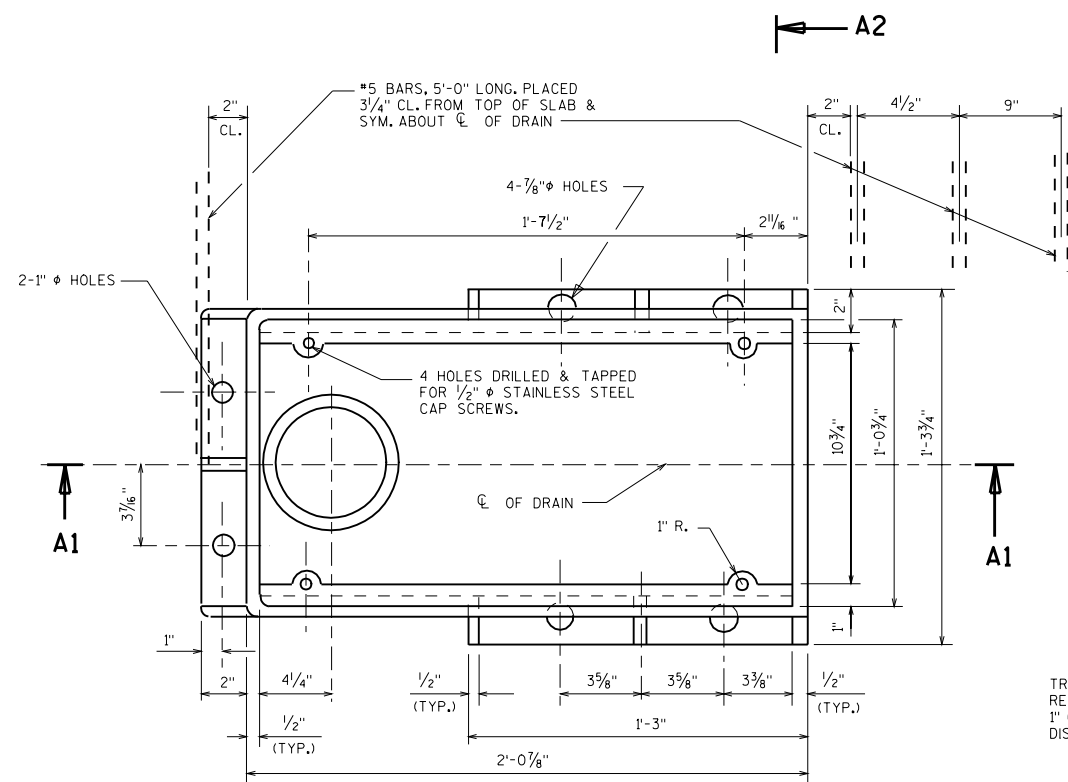
← DIRECTION OF TRAFFIC
DETERMINES THE ORIENTATION
OF PLATES 9 & 10

**COVER PLATES FOR
SIDEWALK W/ STEEL RAIL**

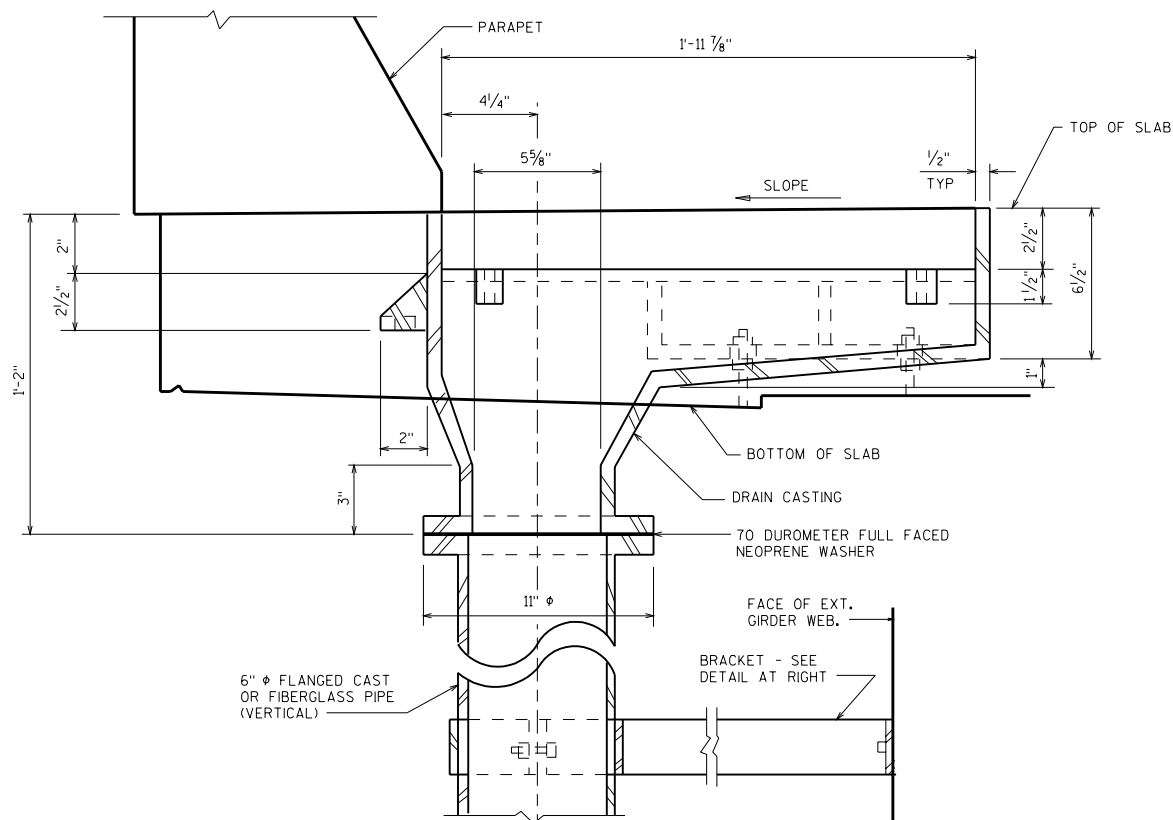
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DATE:
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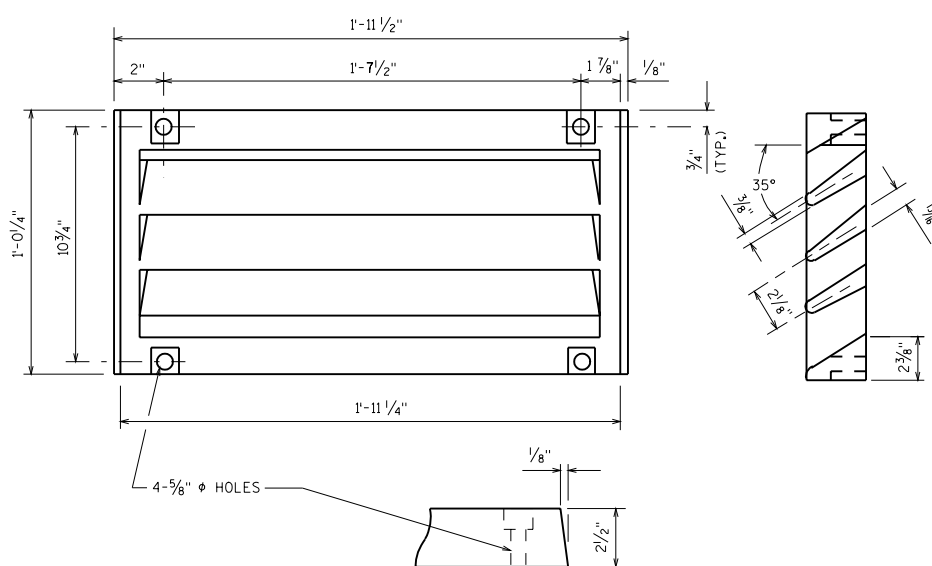


PLAN



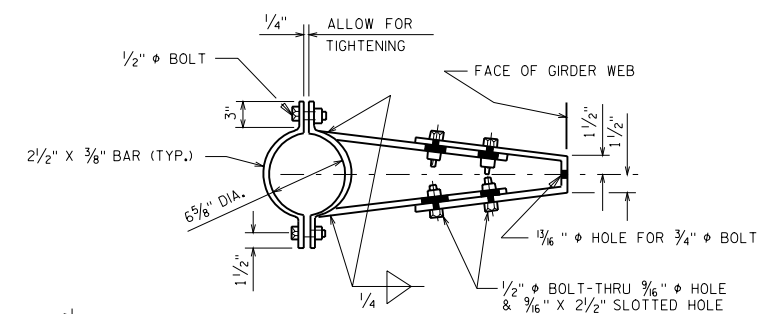
SECTION A1

TRANS. AND LONGIT. SLAB BAR REINF. TO BE CUT A MAX. OF 1" CL. FROM DRAIN FRAME. DISPLACE BARS WHERE POSSIBLE.

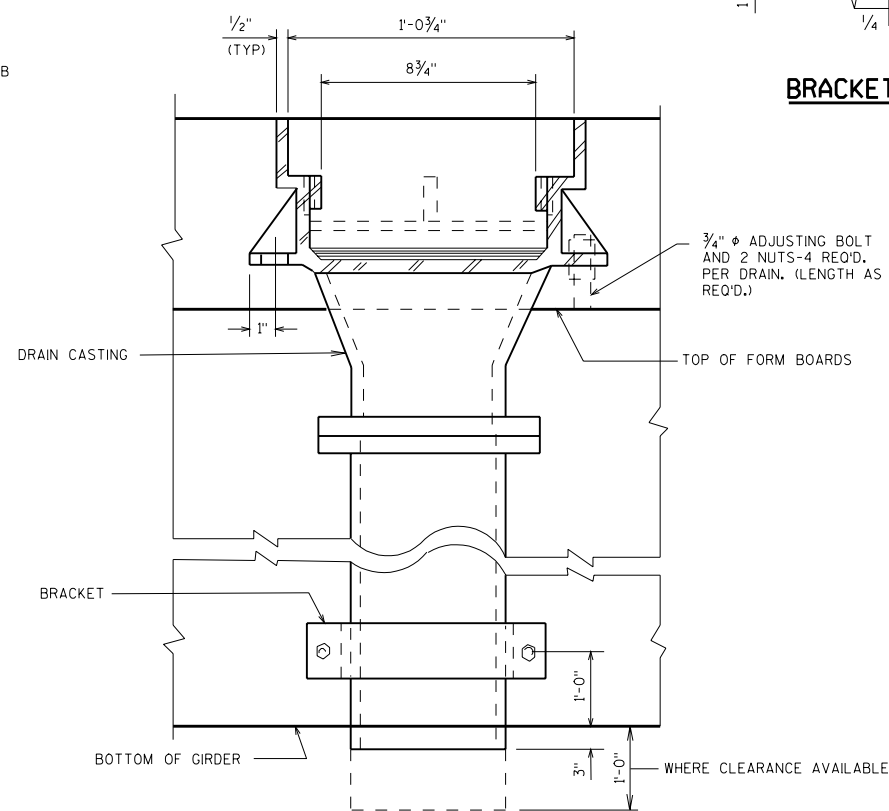


GRATE CASTING DETAIL

ATTACH GRATE TO FRAME FOR SHIPMENT



BRACKET DETAIL



SECTION A2

GENERAL NOTES

ALL MATERIAL FOR TYPE "GC" CASTING, EXCLUDING GRATE HOLD DOWN SCREWS, SHALL BE GRAY IRON CONFORMING TO ASTM A48, CLASS 30. (APPROXIMATE WEIGHT = 225#)

MATERIAL FOR BRACKETS SHALL CONFORM TO ASTM A36.

THE CONTRACTOR MAY PROPOSE AN ALTERNATE TYPE OF BRACKET. THE PROPOSED ALTERNATE DETAILS SHALL BE SUBMITTED AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

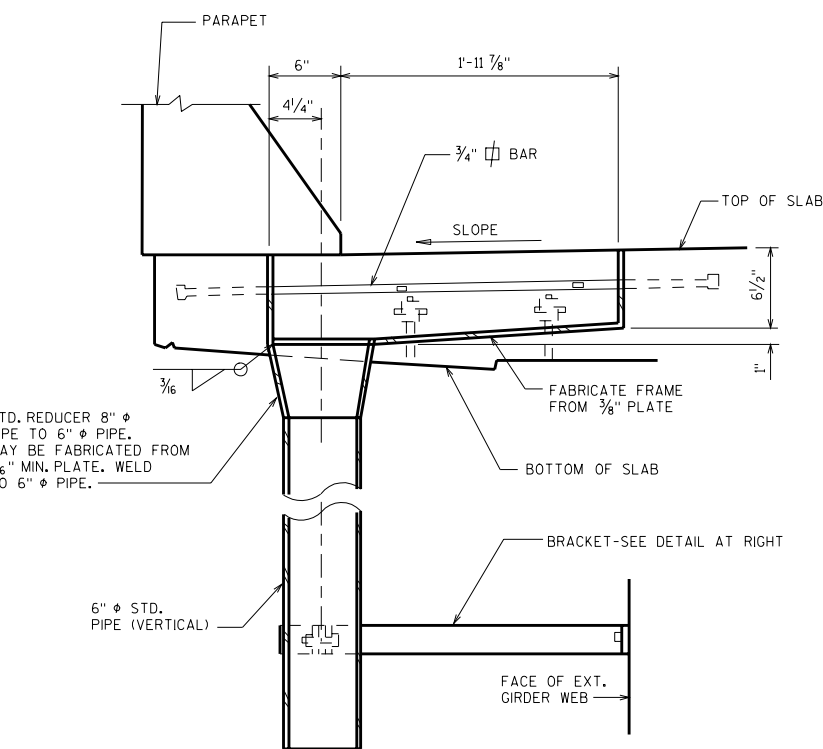
FLANGED 6" DIA. DOWNSPOUTS SHALL BE EITHER CAST MATERIAL OR FIBERGLASS CONFORMING TO ASTM D2996, GRADE 1, CLASS A.

**FLOOR DRAIN
TYPE "GC"**

STATE OF WISCONSIN
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DATE:
1/99



The drawing consists of two views of a manhole assembly. The top view is the **PART PLAN**, showing a central hexagonal opening within a square frame. The frame is labeled $\frac{3}{8}"$ FRAME. The central opening is defined by $\frac{3}{16}"$ dimensions. A note indicates: "WELD ALL BARS AT HOLD DOWN BOLT." The bottom view is a side elevation showing the assembly's profile. It includes a $\frac{3}{8}"$ FRAME at the base. A horizontal bar is labeled "BAR $2\frac{1}{2}" \times \frac{1}{4}"$. Above this is a "HEX HEAD SLOT $\frac{1}{8}"$ TO $\frac{5}{32}"$ WIDE BY $\frac{1}{8}"$ TO $\frac{3}{16}"$ DEEP". A "1/2" ϕ STAINLESS STEEL HOLD DOWN BOLT WITH HEX HEAD AND SQ. NUT, 1 $\frac{1}{4}"$ LONG, WELD NUT TO $\frac{3}{4}" \times \frac{3}{4}"$ BAR (4 PER DRAIN)" is shown. A note states: "FABRICATOR MAY USE A 1/2" THICK STAINLESS STEEL BAR DRILLED & TAPPED FOR 1/2" ϕ BOLT INSTEAD OF SQ. NUT SHOWN." The bottom view also shows a "BAR $1\frac{1}{8}" \times 1\frac{1}{8}" \times \frac{3}{8}"$ WITH $\frac{5}{8}" \phi$ HOLE FOR BOLT" and a "3/4" ϕ BAR". Dimensions include $1\frac{1}{8}" \pm$, $\frac{1}{4}"$, and $\frac{3}{16}"$. A "SEAL WELD" is indicated at the bottom. A note on the left side of the elevation view reads: "1" LONG SPACE $2\frac{3}{4}"$ TOP OF SLAB".

Technical drawing of a drain assembly showing dimensions and components:

- Top dimensions: $\frac{3}{8}$ " (left), $1'-0\frac{3}{4}$ " (total width), $\frac{1}{4}$ " (right).
- Internal dimensions: $6\frac{3}{8}$ " (left), $6\frac{3}{8}$ " (right).
- Vertical dimensions: $\frac{3}{4}$ " (left), $2\frac{1}{2}$ " (center), 4 " (right).
- Components labeled: $\frac{3}{4}$ " ϕ ADJUSTING BOLT AND 2 NUTS - 4 REQ'D. PER DRAIN. (LENGTH AS REQ'D.), BEND LINE, BRACKET.
- Bottom dimensions: $1'-0"$ (left), 3 " (center), $1'-0"$ (right).
- Bottom labels: BOTTOM OF GIRDER, WHERE CLEARANCE AVAILABLE.

Technical drawing of a grate detail, showing front and side views with dimensions and material specifications.

Front View Dimensions and Labels:

- Overall width: 2 SPA'S @ 4"
- Overall height: 1'-11 5/8"
- Top edge label: PLACE THIS EDGE ADJACENT TO PARAPET
- Bar specification: BAR 1 3/4" X 1/4", WELD TO 2 1/2" X 1/4" BAR
- Fastener: HOLD DOWN BOLT
- Spacing: 1/8" C.L.
- Material: CROSS BAR 0.083 SQ. IN. MIN. AREA

Side View Dimensions and Labels:

- Overall length: 1'-0 1/2"
- Bar specification: BAR 2 1/2" X 1/4"
- Bar specification: BAR 1 3/4" X 1/4"

Detail View:

- Weld specification: WELD EVERY 4TH BAR (MIN.) AS SHOWN EXCEPT WHERE NOTED OTHERWISE

Grate Detail

ATTACH GRATE TO FRAME FOR SHIPMENT

G.F.

1/4" ALLOW FOR TIGHTENING

1/2" ϕ BOLT

2 1/2" X 3/8" BAR (TYP.)

3"

6 5/8" D.I.A.

1 1/2"

1/4"

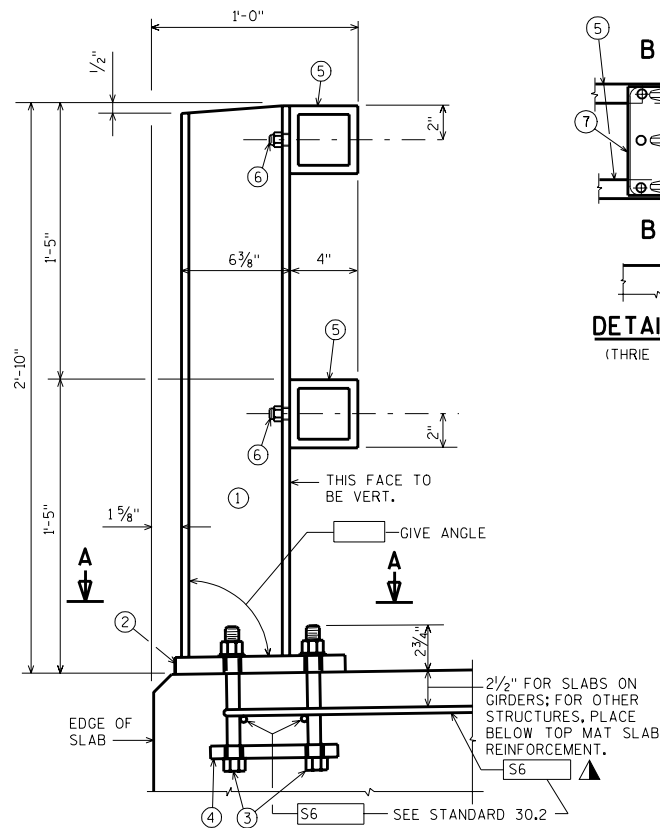
FACE OF GIRDER WEB

1 1/2"

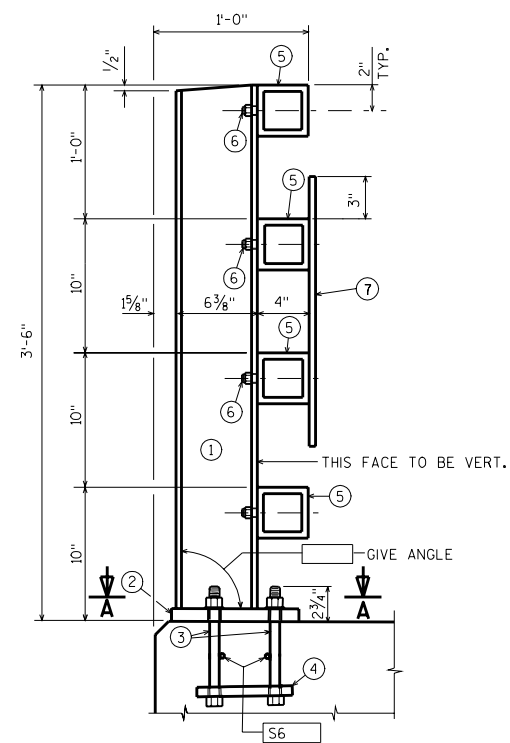
9/16" ϕ HOLE FOR 3/4" ϕ BOLT

1/2" ϕ BOLT-THRU 9/16" ϕ HOLE & 9/16" X 2 1/2" SLOTTED HOLE.

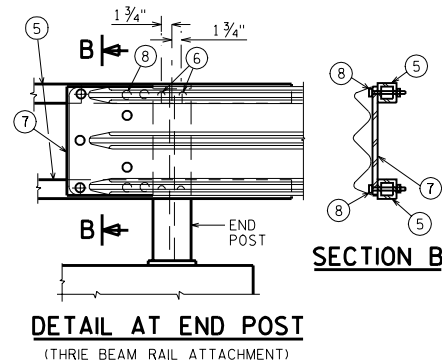
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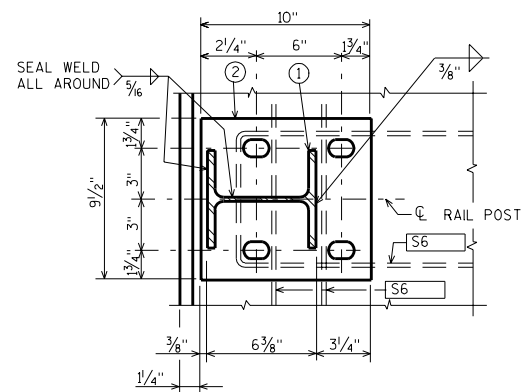
SECTION THRU RAILING ON DECK



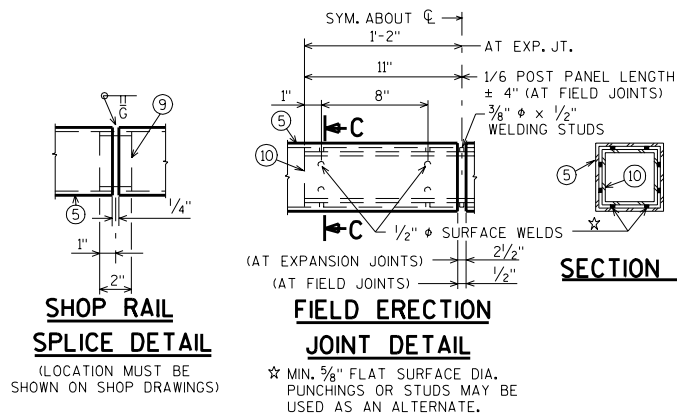
SECTION THRU RAILING ON SIDEWALK



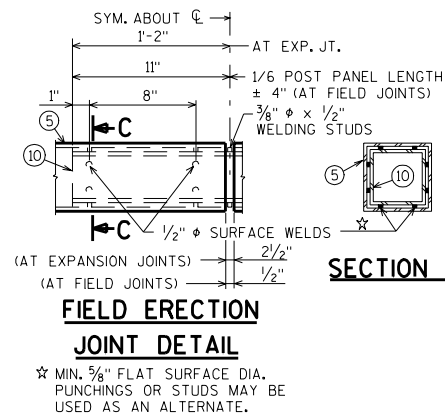
DETAIL AT END POST
(THRIE BEAM RAIL ATTACHMENT)



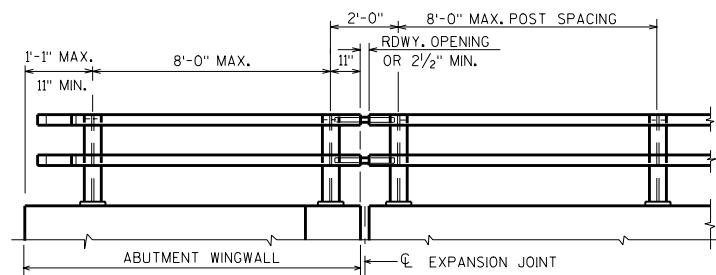
SECTION A



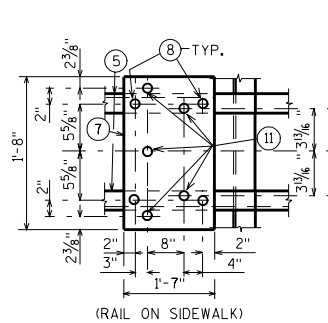
SHOP RAIL SPLICE DETAIL
(LOCATION MUST BE SHOWN ON SHOP DRAWINGS)



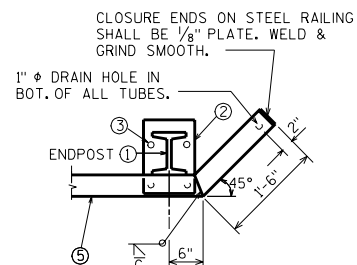
FIELD ERECTION JOINT DETAIL



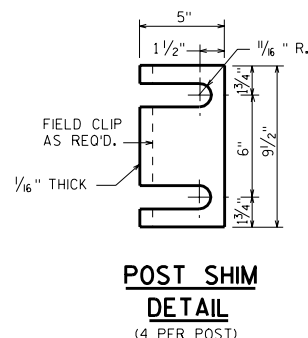
PART ELEVATION OF RAILING



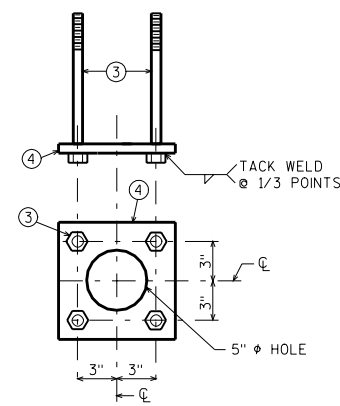
DETAIL FOR END POSTS
WITH THRIE BEAM RAIL ATTACHMENT
(END POST MAY BE LOCATED ON SUPERSTRUCTURE OR WINGWALLS)



DETAIL FOR END POSTS
WITHOUT THRIE BEAM RAIL ATTACHMENT
(END POST MAY BE LOCATED ON SUPERSTRUCTURE OR WINGWALLS)



POST SHIM DETAIL
(4 PER POST)



ANCHORAGE DETAIL

LEGEND

- W6 x 25 WITH 1/4" DIA. HOLES ON EACH SIDE OF POST FOR STUD NO. 6. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY (OR SIDEWALK, AS APPLICABLE). PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- PLATE 1" x 9 1/2" x 10" WITH 1/16" x 1/2" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3, WELD TO NO. 1 AS SHOWN.
- A325 - 7/8" DIA. HEX BOLTS (GALVANIZED) WITH A325 NUT & WASHER. 14" LONG AT END POSTS AND AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 15". USE 8" LONG AT ALL OTHER LOCATIONS. 4 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING.
- 1/4" x 8" x 8" FLAT BAR WITH 15/16" DIA. HOLES FOR ANCHOR BOLTS NO. 3
- TS 4 x 4 x 0.25 STRUCTURAL TUBING, CONFORMING TO A.S.T.M. DESIGNATION A501 OR A500 GRADE B. ATTACH TO NO. 1 WITH STUDS NO. 6.
- 5/8" DIA. x 1 1/2" LONG SHOP WELDED STUDS WITH HEX NUT AND 2" WASHERS (2 REQ'D. AT EACH RAIL TO POST LOCATION.)
- PLATE 3/8" x 1'-4" (1'-7" ON SDWK.) x 1'-8". BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THRIE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5.
- 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5 FOR 7/8" DIA. A325 BOLTS W/HEX NUTS AND WASHERS.
- SQUARE SLEEVE FABRICATED FROM 1/4" PLATE. PROVIDE "SLIDING FIT" WITH A MINIMUM OUT TO OUT DIMENSION OF 3 9/16".
- TS 3 x 3 x 0.25 x (2'-4" AT EXPANSION JOINTS) & (1'-10" AT FIELD JOINTS) LONG. PROVIDE 1/2" DIA. SURFACE WELDS ON ALL SIDES AS SHOWN. GRIND WELDS TO FIT FREE INTO I.D. OF NO. 5. PROVIDE 3/8" DIA. x 1/2" WELDING STUDS ON TOP AND BOTTOM SURFACES AT CENTERLINE.
- 7/8" DIA. x 1 1/2" LONG THREADED SHOP WELDED STUDS. (REQ'D. FOR SDWK. RAIL ONLY.)

GENERAL NOTES

BID ITEM SHALL BE "TUBULAR RAILING TYPE 'F'", WHICH INCLUDES ALL ITEMS SHOWN.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

FOR RAILING NOT TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 4) SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.

FOR RAILING TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 3 & 4) SHALL BE PAINTED WITH A THREE-COAT ZINC RICH EPOXY SYSTEM. PRIOR TO PAINTING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 11 NEAR WHITE BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.

ALL MATERIALS USED IN FABRICATION SHALL BE MADE FROM MATERIALS CONFORMING TO ASTM A709 GRADE 36 UNLESS NOTED OTHERWISE.

FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQ'D. FOR ALIGNMENT.

▲ TIE TO TOP MAT OF STEEL.

TUBULAR STEEL RAILING TYPE 'F'

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⊗ PAY LIMITS FOR TYPE "W" STEEL RAILING.

-EXPANSION SPLICE IN BEAM GUARD AND CHANNEL RAIL SHALL BE DETAILED AT A POST ON EITHER SIDE OF EXPANSION JOINT. (ONLY ONE REQ'D.)



(4 PER POST)

- ① W 6 x 25 WITH $\frac{3}{4}$ " x $2\frac{1}{2}$ " VERT. SLOTS IN FLG. (SLOT ON OTHER SIDE OF WEB IS OPTIONAL) FOR NO. 7. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POSTS VERTICAL AND NORMAL TO GRADE LINE.
- ② C 8 x 11.5 WITH $\frac{1}{8}$ " DIA. HOLES FOR NO. 8.
- ③ BASE PLATE 1" x $9\frac{1}{2}$ " x 10" WITH $\frac{1}{16}$ " x $\frac{1}{2}$ " SLOTTED HOLES FOR ANCHOR BOLTS NO. 4. WELD TO NO. 1 AS SHOWN.
- ④ A325 - $\frac{7}{8}$ " HEX BOLTS (GALVANIZED) WITH A325 NUT AND WASHER. 14" LONG AT END POSTS AND AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 15 ". USE 8" LONG AT ALL OTHER LOCATIONS. 4 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 3. CHAMFER TOP OF BOLTS BEFORE THREADING.
- ⑤ $\frac{1}{4}$ " x 8" x 8" FLAT BAR, WITH $\frac{1}{8}$ " DIA. HOLES FOR ANCHOR BOLTS NO. 4.
- ⑥ $1\frac{3}{4}$ " x 3" MOUNTING BOLT WASHER (GALVANIZED.)
- ⑦ $\frac{5}{8}$ " DIA. BUTTON HEAD POST MOUNTING BOLT WITH ROUND WASHER AND NUT.
- ⑧ $\frac{5}{8}$ " DIA. x 2" HEX BOLTS WITH NUT AND TWO WASHERS EACH.
- ⑨ PLATE $\frac{1}{2}$ " x $5\frac{3}{4}$ " x 6" AT BASIC POST CONNECTION. $\frac{1}{4}$ " DIA. HOLES IN PLATE. $\frac{1}{8}$ " DIA. HOLES IN CHANNEL.
- ⑩ PLATE $\frac{1}{2}$ " x $5\frac{3}{4}$ " x $1\text{'-}2\frac{1}{2}$ ". $\frac{1}{4}$ " DIA. HOLES IN PLATE. $\frac{1}{8}$ " DIA. HOLES IN CHANNEL. EXPANSION SLOTS ON JOINT SIDE OF POST. $\frac{1}{16}$ " x $2\frac{1}{4}$ " IN PLATE. $\frac{1}{8}$ " x $2\frac{1}{4}$ " IN CHANNEL. (AT EXPANSION SPLICE.)
- ⑪ PLATE $\frac{1}{2}$ " x $5\frac{3}{4}$ " x $1\text{'-}1\frac{1}{2}$ ". $\frac{1}{4}$ " DIA. HOLES IN PLATE. $\frac{1}{8}$ " DIA. HOLES IN CHANNEL. (AT TYPICAL SPLICE.)

BID ITEM SHALL BE STEEL RAILING TYPE "W" WHICH INCLUDES ALL ITEMS SHOWN.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 5)
SHALL BE GALVANIZED AFTER FABRICATION.

PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS AND CHANNELS SHALL BE GIVEN A NO. 6 COMMERCIAL BLAST CLEANING BY S.S.P.C. SPECS.

ALL MATERIAL USED IN FABRICATION SHALL BE
MADE FROM MATERIALS CONFORMING TO A.S.T.M.
DESIGNATION A709 GRADE 36 UNLESS NOTED
OTHERWISE.

FILL BOLT SLOT OPENINGS IN POST SHIMS & PLATE NO. 3 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

PAY LIMITS FOR "GUARD RAIL" SHALL BE FROM
 ₪ TO ₪ OF END POSTS.

RAIL MEMBERS SHALL BE "W" OR "THRIE" BEAMS
CONFORMING TO A.A.S.H.T.O. M180, CLASS A,
TYPE 2.

CHANNEL MEMBER SHALL BE ATTACHED CONTINUOUSLY TO A MINIMUM OF FOUR POSTS AND A MAXIMUM OF EIGHT (EXCEPT AT ABUTMENTS).

AT EXPANSION SLOTS IN RAIL AND CHANNEL MEMBERS, TIGHTEN BOLTS, BACK OFF ONE HALF TURN AND BURR THREADS. RAIL MEMBERS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC AND THE UPPER RAIL SHALL LAP THE LOWER RAIL.

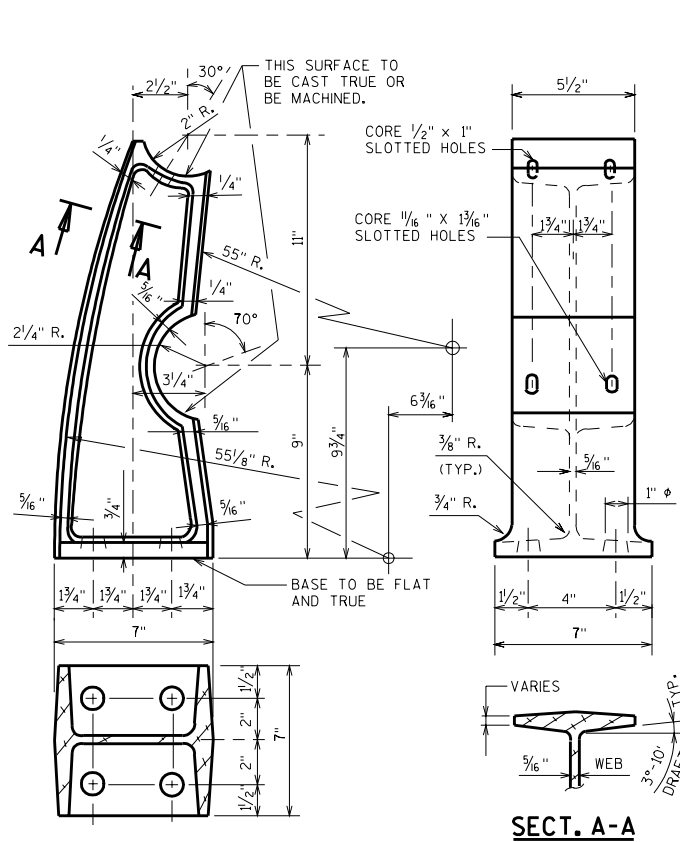
STEEL POST SHIMS MAY BE USED UNDER POSTS
WHERE REQ'D. FOR ALIGNMENT.

 TIE TO TOP MAT OF STEEL.

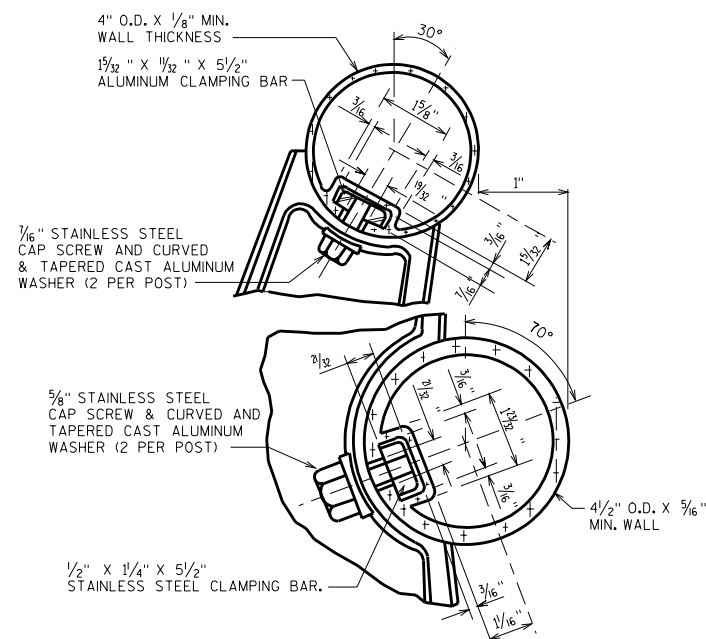
APPROX. RAILING WT. = 45 #/FT.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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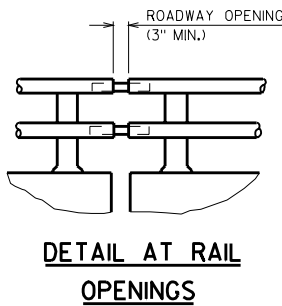
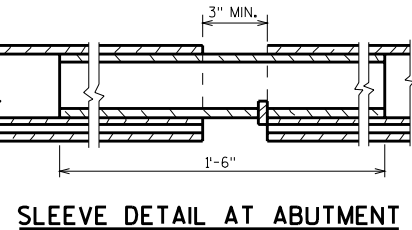
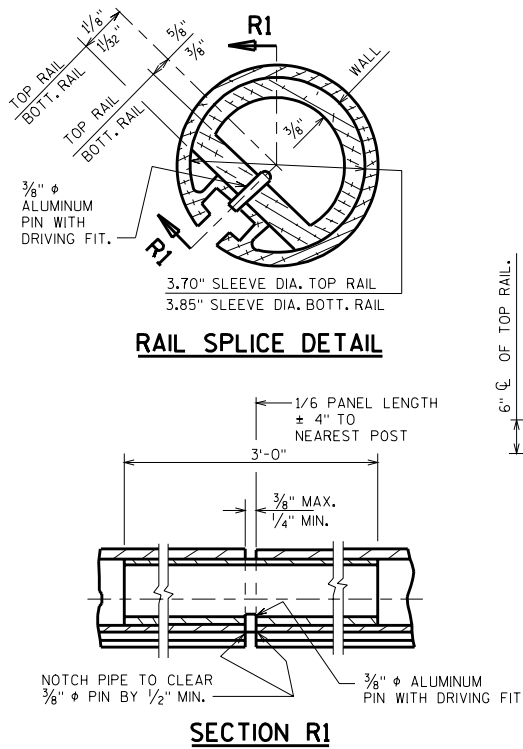


ALUMINUM POST CASTING

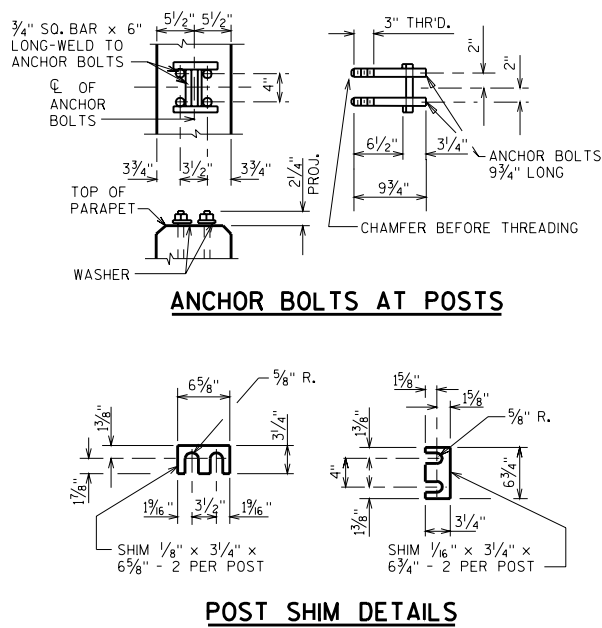
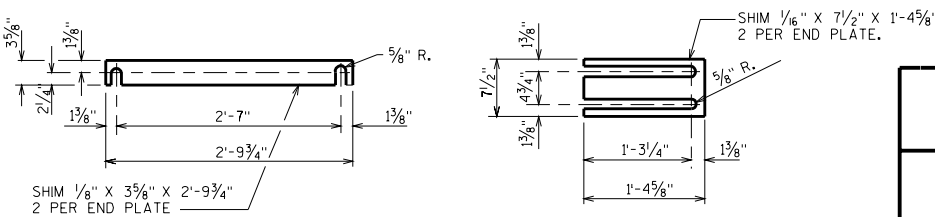
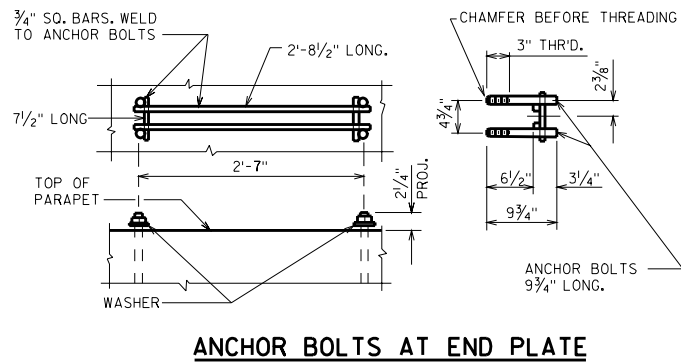
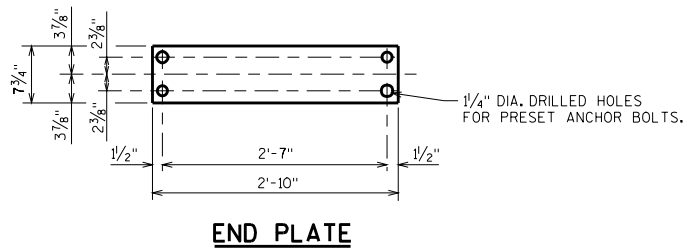
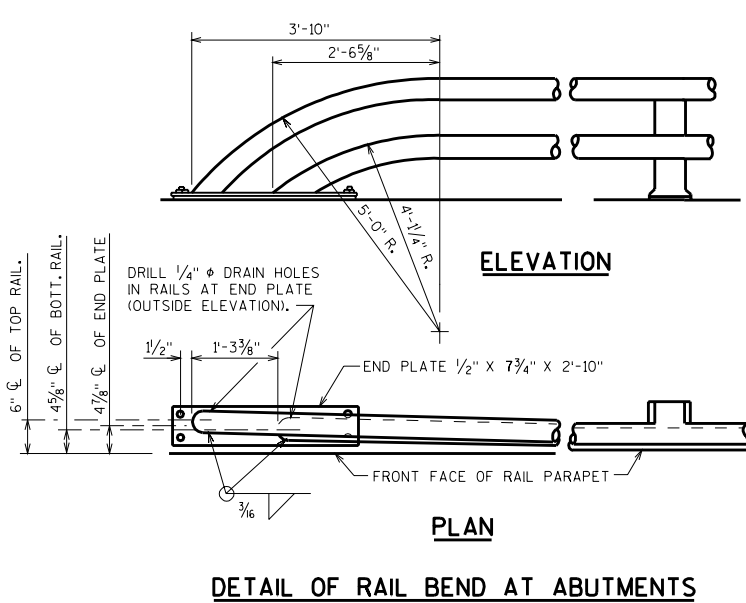


DETAIL OF ATTACHMENT TO POST

NOTES: MAX. REDUCTION IN DIAMETER OF BENT SECTION SHALL BE 3%. WALL THICKNESS OF TUBING SHOWN ABOVE SHALL BE MIN. NOMINAL AVERAGE WALL THICKNESS. MAX. REDUCTION IN SLOT WIDTH IN BENT TUBING SHALL BE 1/16".



ALL SLEEVE DETAILS SAME AS "RAIL SPLICE DETAIL" UNLESS SHOWN OTHERWISE



GENERAL NOTES

BID ITEM SHALL BE TUBULAR RAILING, TYPE "H" WHICH INCLUDES ALL ITEMS SHOWN.

THE SHANK AND ROOT DIAMETER OF THREAD FOR ANCHOR BOLTS SHALL BE A MIN. OF 5/8".

SHIMS SHALL CONFORM TO SAME MATERIAL AS POSTS.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL.

RAILINGS SHALL BE FABRICATED IN 2 AND 3 PANEL LENGTHS.

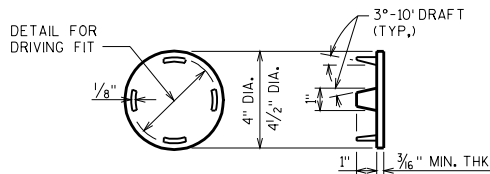
RAILING POSTS SHALL BE SET NORMAL TO GRADE LINE.

ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG CENTERLINE OF THE POST BASE.

SHIMS SHALL BE USED UNDER POSTS AND END PLATES WHERE REQ'D. FOR ALIGNMENT.

FILL ALL EXPOSED OPENINGS BETWEEN SHIMS AND POST ANCHOR BOLT HOLES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

RAILS SHALL BE BUILT STRAIGHT AND SPRUNG INTO PLACE FOR STRUCTURES CURVED UP TO 3°. FOR STRUCTURES CURVED GREATER THAN 3°, RAILS SHALL BE CURVED TO FIT.



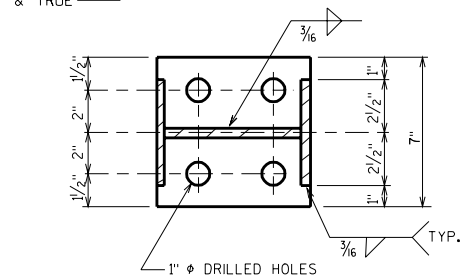
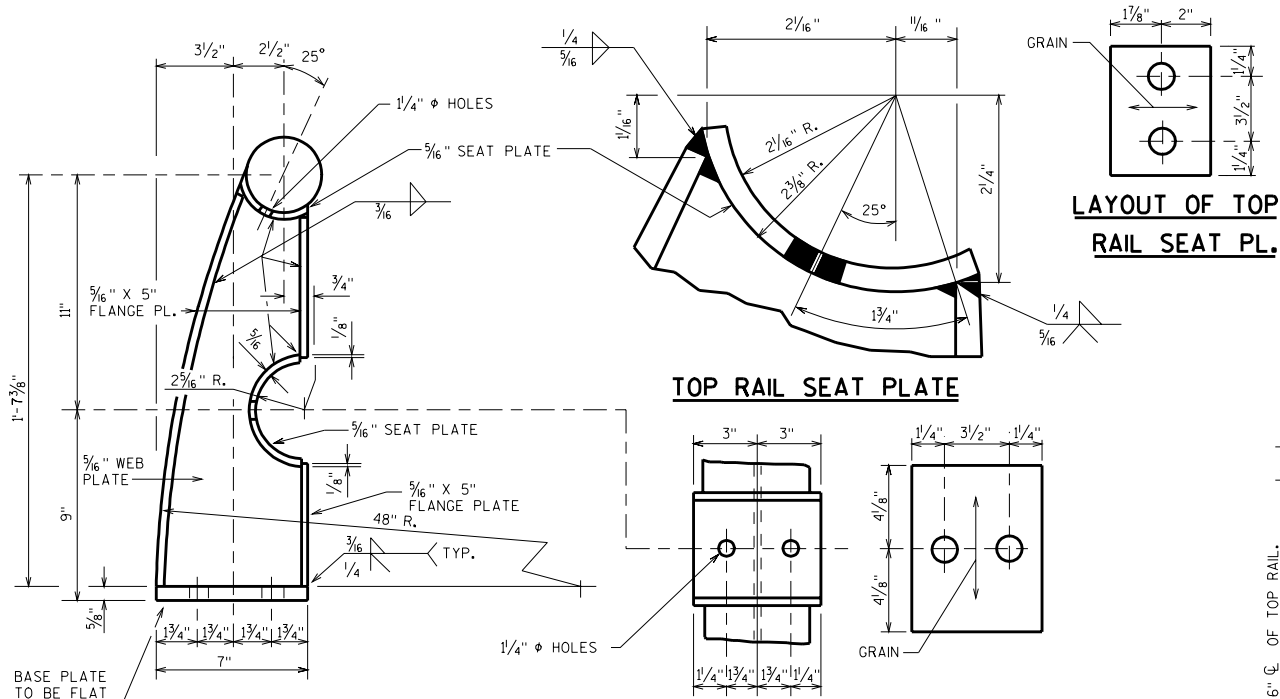
TUBULAR RAILING TYPE "H" (ALUM.)

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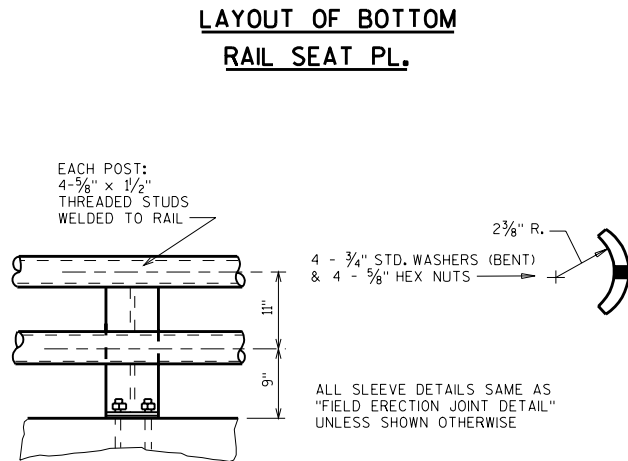
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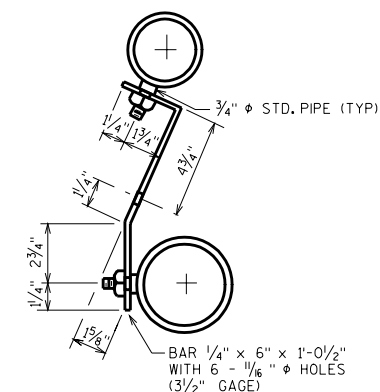
1/03



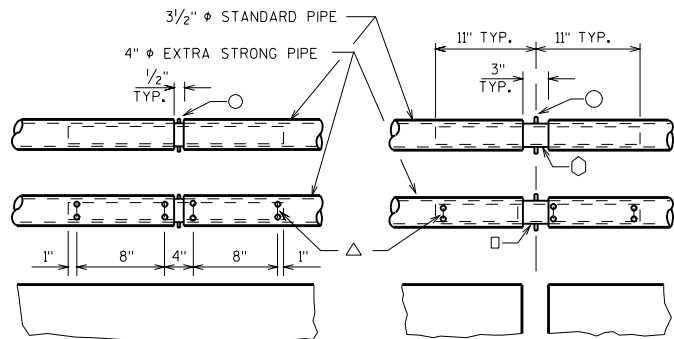
STEEL POST DETAILS



RAIL TO POST CONN.

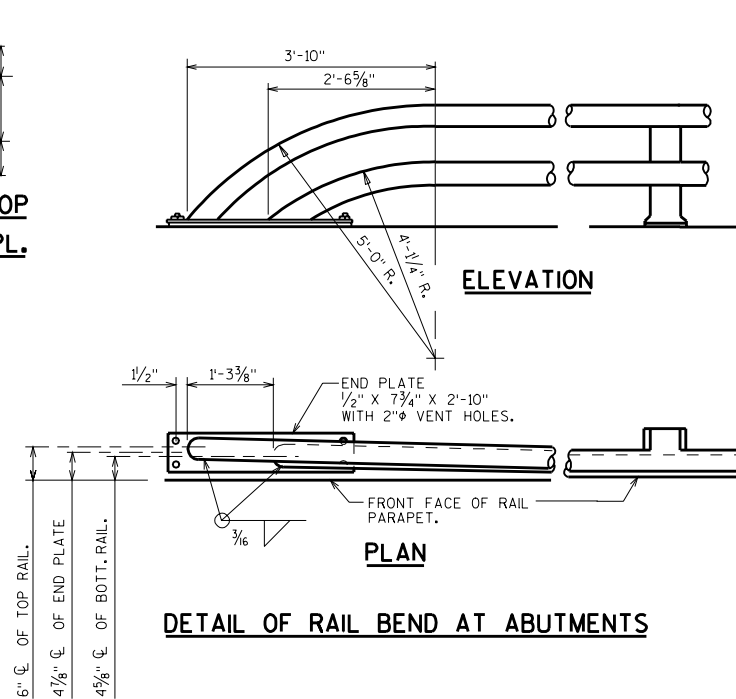


SHIPPING BAR
END SECTION ONLY

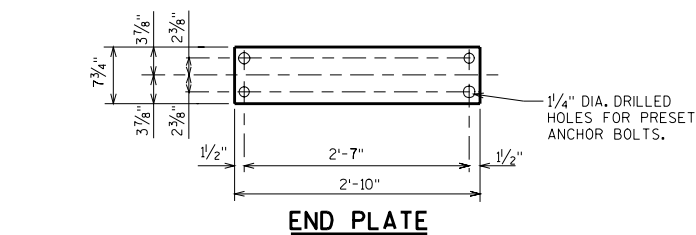


**FIELD ERECTION
JOINT DETAIL**

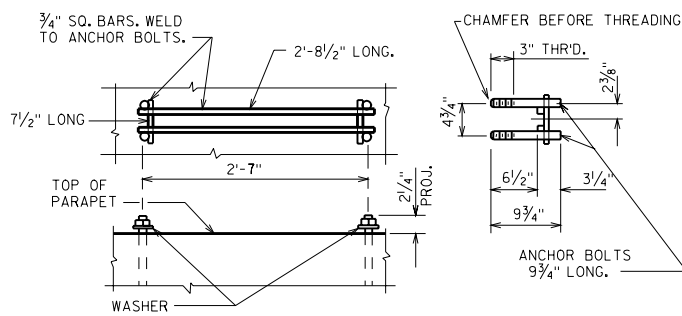
**DETAIL AT RAIL
OPENING**



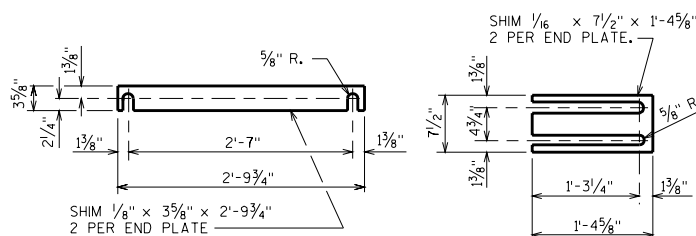
DETAIL OF RAIL BEND AT ABUTMENTS



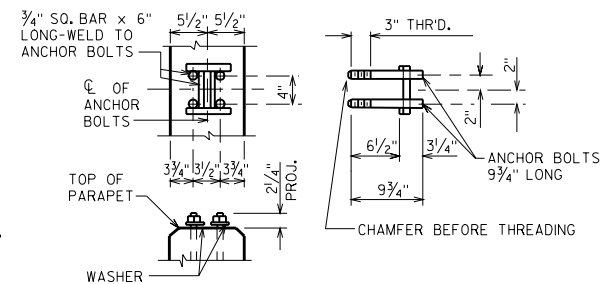
END PLATE



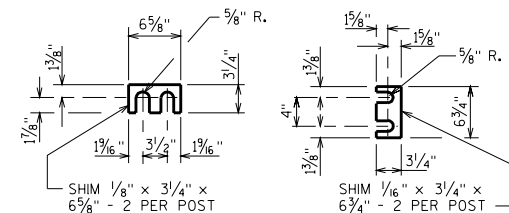
ANCHOR BOLTS AT END PLATE



END PLATE SHIM DETAILS



ANCHOR BOLTS AT POSTS



POST SHIM DETAILS

GENERAL NOTES

BID ITEM SHALL BE TUBULAR RAILING, TYPE "H" WHICH INCLUDES ALL ITEMS SHOWN.

THE SHANK AND ROOT DIAMETER OF THREAD FOR ANCHOR BOLTS SHALL BE A MIN. OF 5/8".

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR ASTM A307. IF A307 IS USED ELECTRO-GALVANIZE NUTS, WASHERS & TOP 3/2" OF ANCHOR BOLTS.

CLOSURE ENDS ON STEEL RAILING SHALL BE 1/8" PLATE. WELD AND GRIND SMOOTH.

RAILINGS SHALL BE FABRICATED IN 2 AND 3 PANEL LENGTHS.

RAILING POSTS SHALL BE SET NORMAL TO GRADE LINE.

ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG CENTERLINE OF THE POST BASE.

SHIMS SHALL BE USED UNDER POSTS AND END PLATES WHERE REQ'D. FOR ALIGNMENT.

FILL ALL EXPOSED OPENINGS BETWEEN SHIMS AND POST ANCHOR BOLT HOLES WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

RAILS, POSTS & SHIMS SHALL BE MADE FROM MATERIALS CONFORMING TO A.S.T.M. DESIGNATION A709, GRADE 36.

ALL MATERIALS, EXCEPT ANCHORAGES, SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.

RAILS SHALL BE BUILT STRAIGHT AND SPRUNG INTO PLACE FOR STRUCTURES CURVED UP TO 3°. FOR STRUCTURES CURVED GREATER THAN 3°, RAILS SHALL BE CURVED TO FIT.

LEGEND

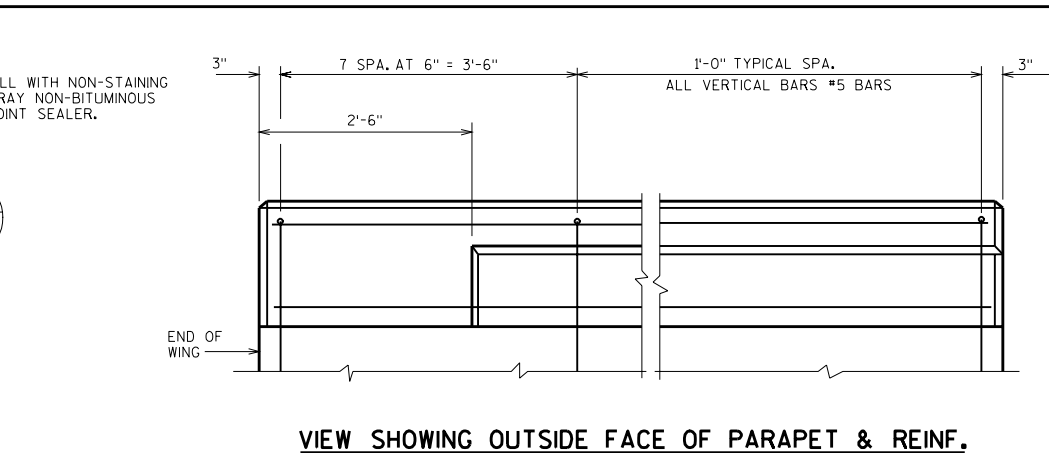
- 3/8" x 3/8" WELDED STUDS
- 3" STD. PIPE x 1'-10" LONG
- 3" EXTRA STRONG PIPE x 1'-10" LONG
- △ 1/2" WELD BEADS AT 1/3 PTS. ON PIPE 11" CIRCUMF. GRIND BEADS SO THAT SLEEVE FITS FREELY IN THE I.D. OF 4" EXTRA STRONG PIPE.

TUBULAR RAILING TYPE "H" (STEEL)

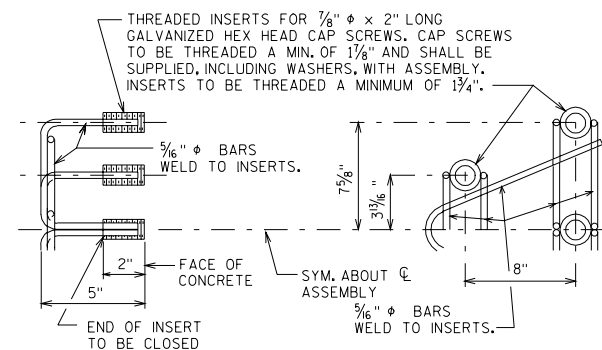
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1/03



VIEW SHOWING OUTSIDE FACE OF PARAPET & REINF.




DETAIL OF ANCHOR ASSEMBLY

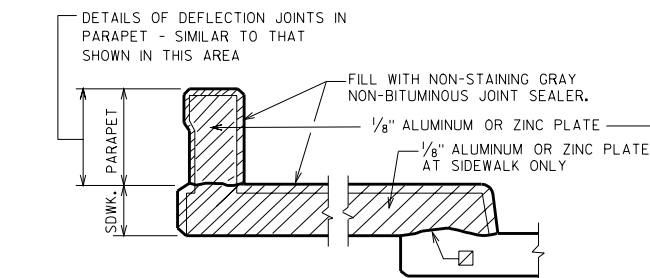
NOTE: HEX. HEAD CAP SCREWS & WASHERS TO BE GALVANIZED
IN ACCORDANCE WITH AASHTO M232 CLASS C.

ASSEMBLY SHALL BE BID ITEM "ANCHOR ASSEMBLY FOR BEAM GUARD". EACH.

NOTES

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 1/8" ZINC OR ALUMINUM PLATE CUT AS SHOWN IN SECTION "D" BY SHADED AREA. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINTS, ONE SIDE OF JOINT SHALL BE COATED WITH BITUMINOUS PAINT AND PLATE SEPARATORS MAY BE OMITTED.

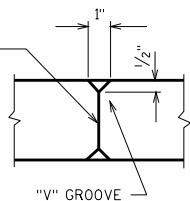
- ☒ HORIZ. CONST. JOINT-STRIKE OFF AS SHOWN
AND LEAVE ROUGH.
-  END 2'-0" AWAY FROM FACE OF ABUT.



SECTION D

SHOWING DEFLECTION JOINT IN PARAPET OR
SIDEWALK USING THE FOLLOWING CRITERIA:

1. GIRDER STRUCTURES AND SLAB STRUCTURES WITH A SIDEWALK SHOULD HAVE A DEFLECTION JOINT IN THE SIDEWALK AND PARAPET OVER THE PIER.
2. GIRDER STRUCTURES AND SLAB STRUCTURES WITHOUT SIDEWALKS SHOULD HAVE NO DEFLECTION JOINTS IN THE PARAPETS.



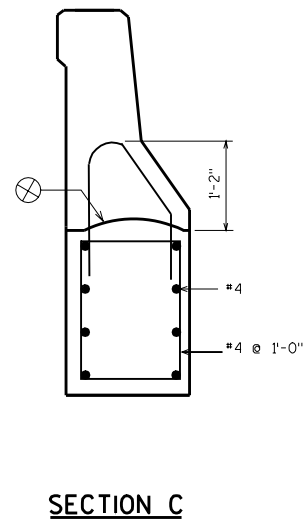
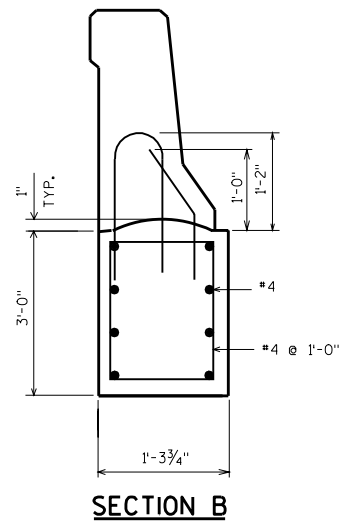
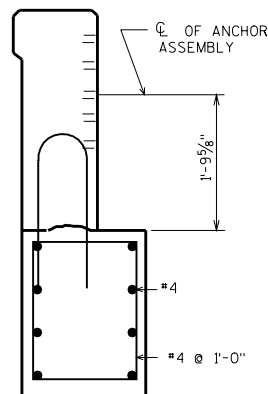
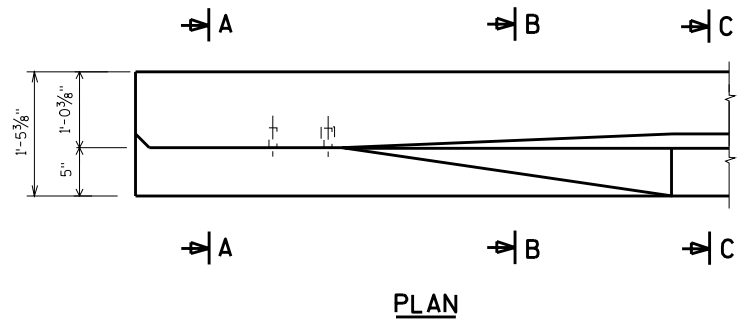
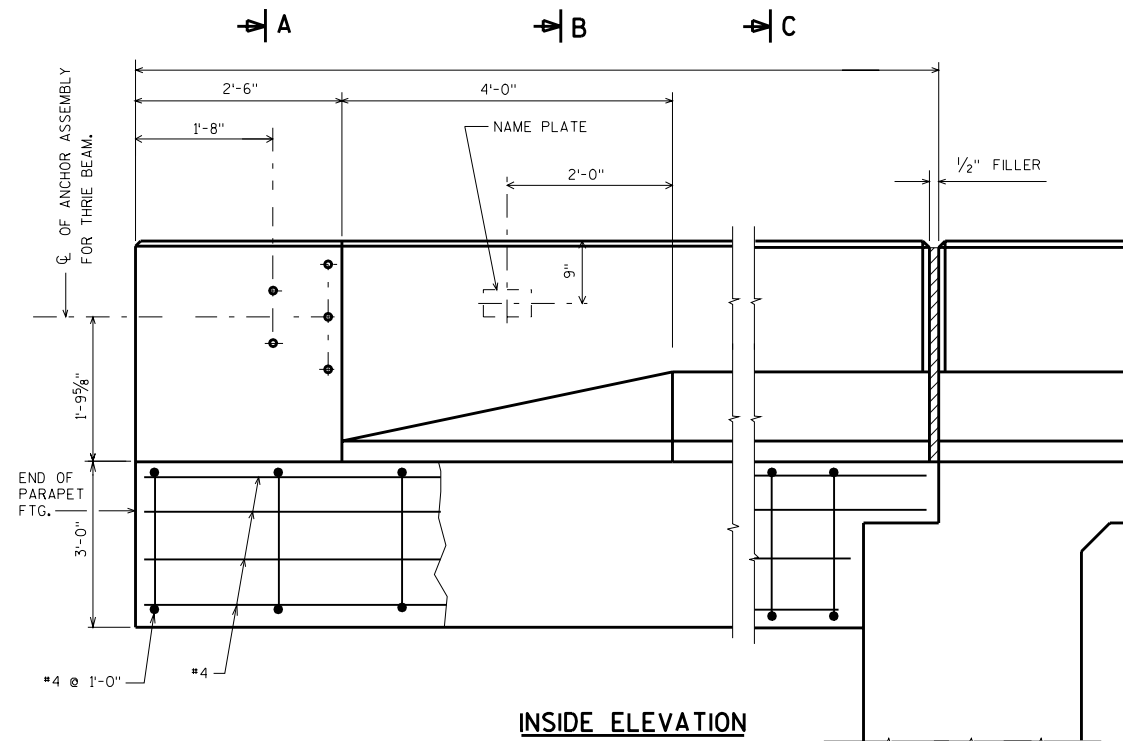
SECTION E

VERTICAL FACE
PARAPET 'A'

STATE OF WISCONSIN
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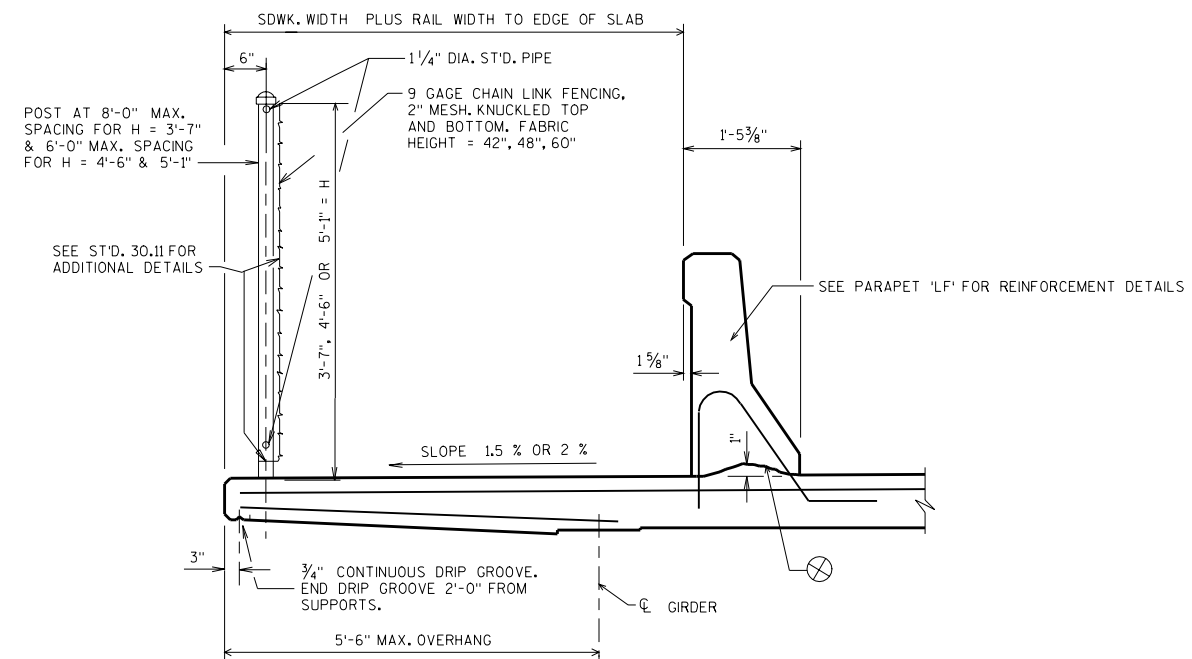


DESIGNER NOTES

FOR PARAPET 'LF' DETAILS & REINFORCING DETAILS
SEE SLOPED FACE PARAPET 'LF'. (STANDARD 30.12)

ALL PARAPET FOOTING BARS SHALL BE EPOXY COATED.

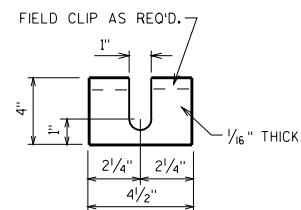
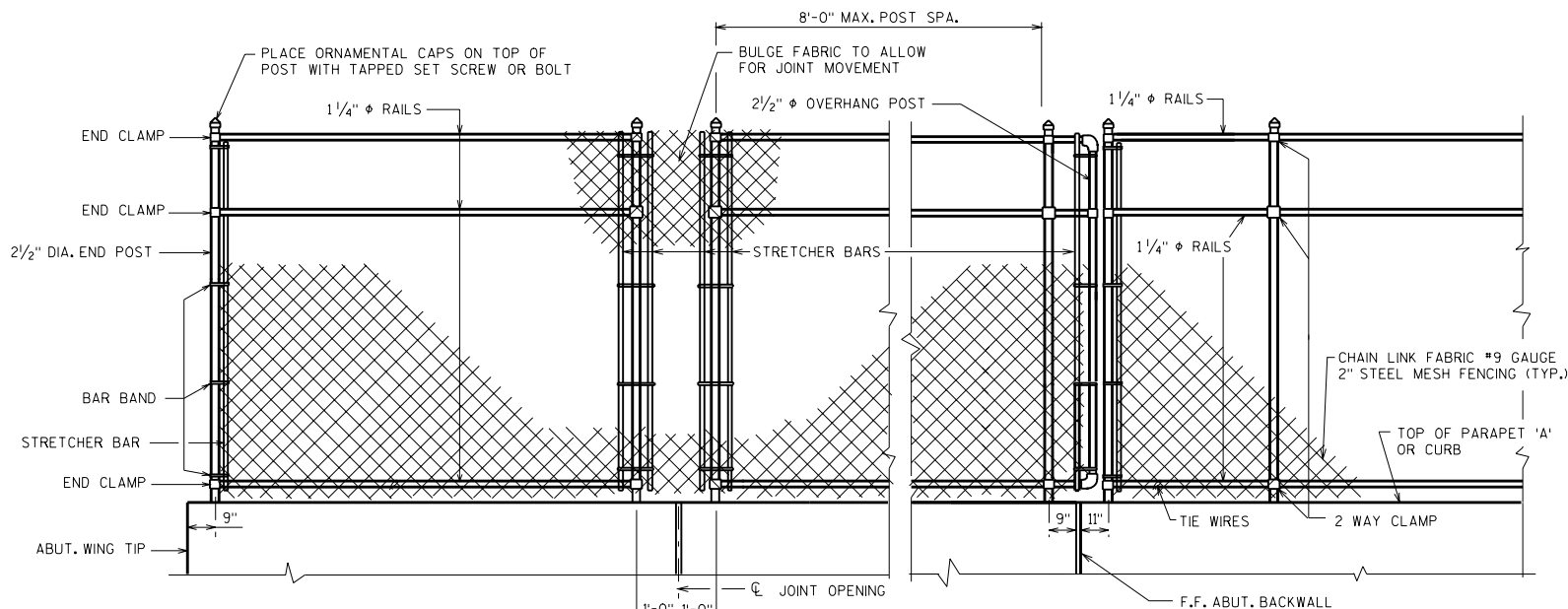
⊗ CONST. JT. - STRIKE OFF AS SHOWN & LEAVE ROUGH



PARAPET FOOTING

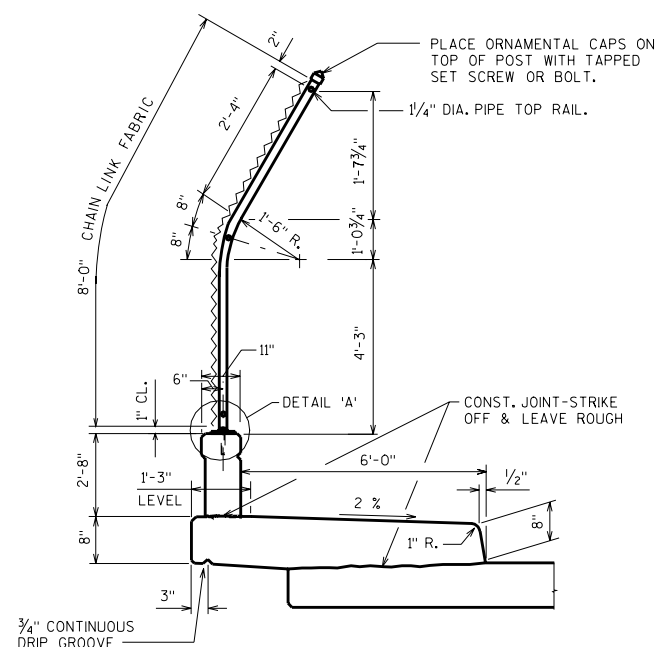
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

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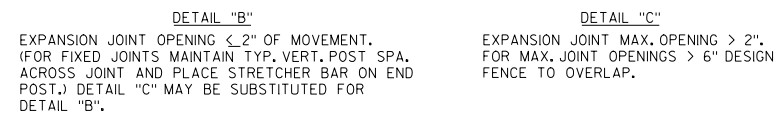
POST SHIM DETAILS

SHIMS REQUIRED ONLY WHEN POSTS ARE WELDED TO BASE PLATES. PROVIDE 4 SHIMS PER POST.

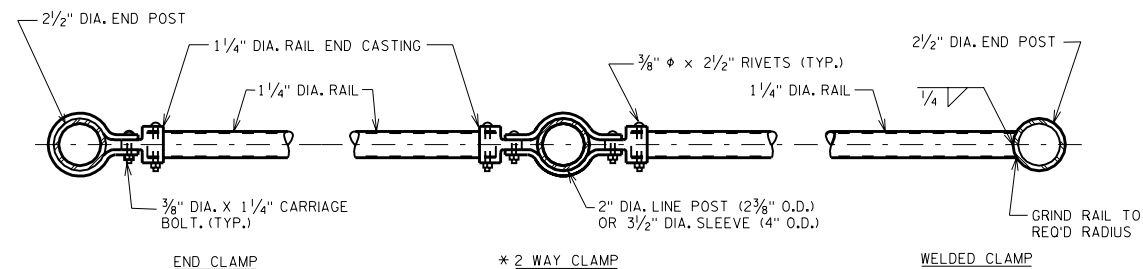


SECTION THRU FENCE

NOTE: FOR NON-SIDEWALK APPLICATIONS USE VERTICAL POSTS. (NO BEND)

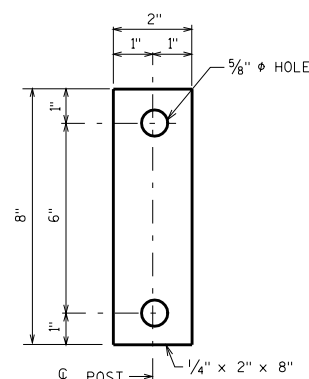


FENCE PART ELEVATION

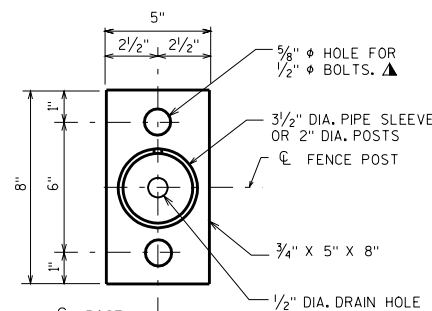


PLAN OF RAILING

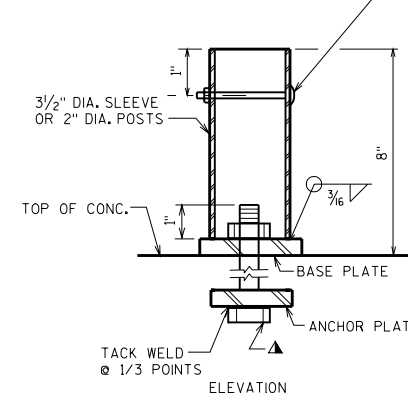
NOTE: PLACE ALL NUTS ON OUTSIDE OF FENCE



ANCHOR PLATE



BASE PLATE



POST ATTACHMENT

UNIT SHALL BE GALV. AFTER FABRICATION

NOTE: IN LIEU OF USING THE 3 1/2\"/>

GENERAL NOTES

POSTS ARE TO BE SET VERTICAL.

KNUCKLE TOP AND BOTTOM OF 2\"/>

ALL FENCING COMPONENTS SHALL BE GALVANIZED STEEL OR APPROVED ALTERNATE LISTED BELOW.

ALL RAILS, POSTS AND SLEEVES ARE STANDARD WEIGHT PIPE, SCHEDULE 40.

PLACE ALL NUTS ON OUTSIDE OF FENCE.

TOP RAIL SHALL BE CONTINUOUS OVER INTERIOR POSTS. MINIMUM LENGTH OF TOP RAIL BETWEEN SPLICES SHALL BE 20'-0\"/>

ALTERNATE FENCING MATERIALS ARE ALUMINUM, ALUMINUM COATED STEEL, AND APPROVED COLOR COATING SYSTEMS. IF ALTERNATE MATERIALS ARE USED FOR POSTS & RAILS, THESE ELEMENTS SHOULD BE DESIGNED.

PEDESTRIAN RAILING MAY BE USED ON WINGWALL PARAPETS IF CHAIN LINK FENCE DOES NOT CONTINUE BEYOND BRIDGE.

HANDRAILS SHALL BE USED ALONG BRIDGE SIDEWALKS WHERE THE SLOPE OF THE SIDEWALK IS GREATER THAN 5%. TOP OF HANDRAIL GRIPPING SURFACES SHALL BE MOUNTED BETWEEN 30\"/>

* ALTERNATE BOULEVARD 2-WAY CLAMP MAY BE USED WHEN THE POST IS EITHER BOLTED TO THE 3 1/2\"/>

▲ 1/2\"/>

☆ 1/2\"/>

DRILL 3/8\"/>

FILL PIPE SLEEVE AND BEVEL AWAY FROM POST WITH NON-SHRINK GROUT AFTER SETTING POST.

3/8\"/>

BOTTOM OF MESH FENCING.

BASE PLATE 3/4\"/>

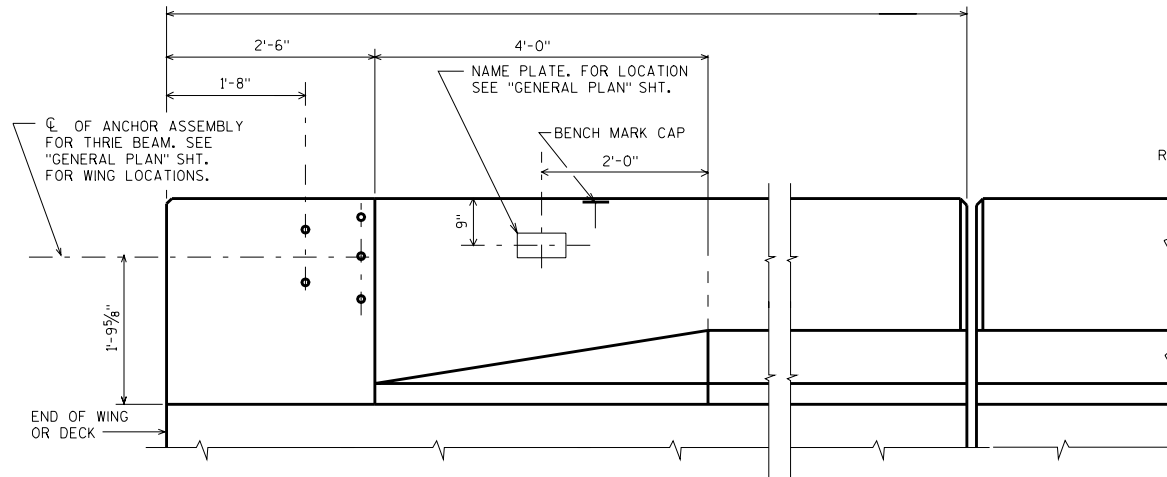
DETAIL A

CHAIN LINK FENCE DETAILS

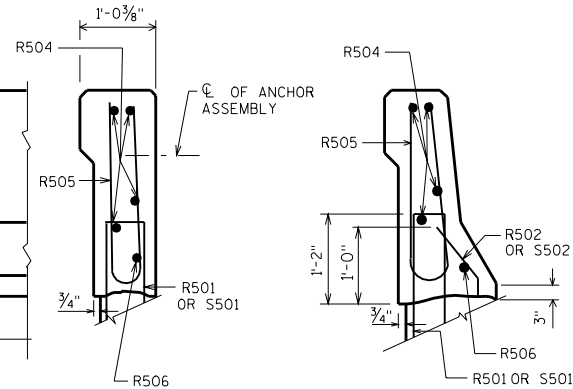
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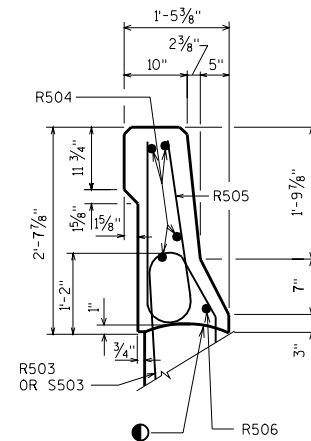


INSIDE ELEVATION



SECTION A

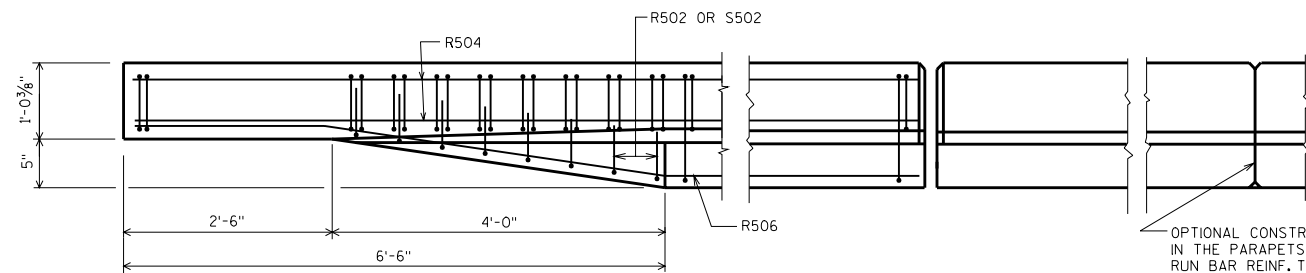
SECTION B



SECTION C

BILL OF BARS
FOR ABUTMENT PARAPETS

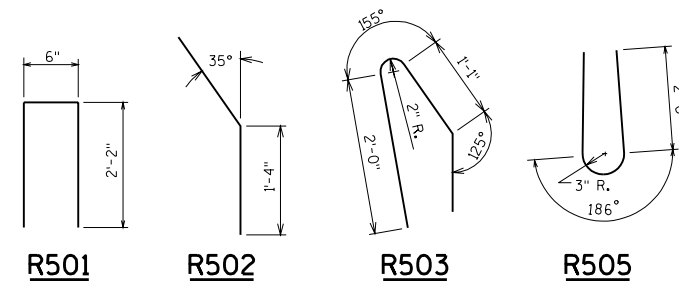
BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BENT	LOCATION
R501	X			4'-7"	X	PARAPET VERT.
R502	X			2'-4"	X	PARAPET VERT.
R503	X			4'-6"	X	PARAPET VERT.
R504	X					PARAPET HORIZ.
R505	X			4'-10"	X	PARAPET VERT.
R506	X				X	PARAPET HORIZ.
S501	X			4'-5"	X	PARAPET VERT.
S502	X			2'-4"	X	PARAPET VERT.
S503	X			4'-2"	X	PARAPET VERT.



PLAN

EXPANSION JOINT @ ABUT.
0° SKEW SHOWN. MATCH EXP.
JT. OPENING.
FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET.
SEE STD. 12.1.

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 'V' GROOVE.

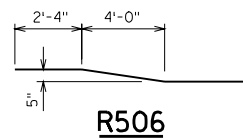


R501

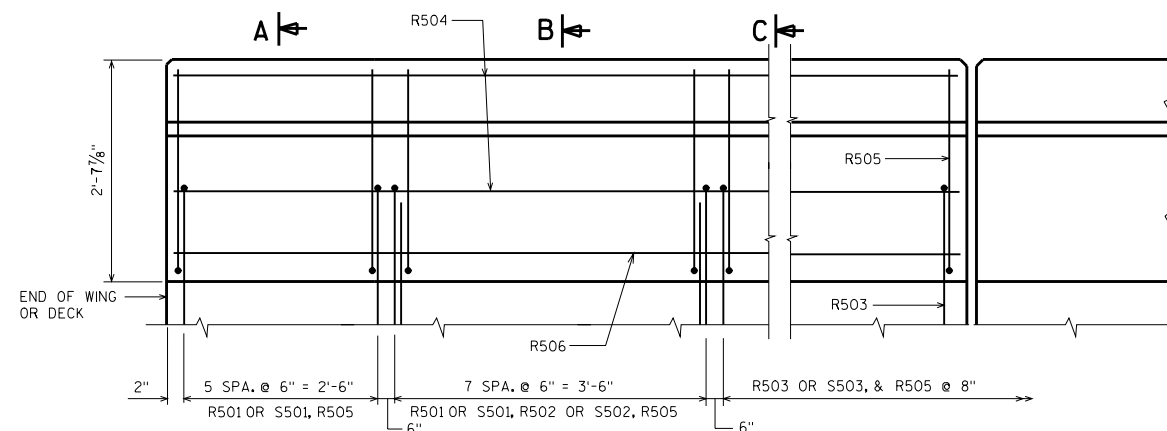
R502

R503

R505



R506

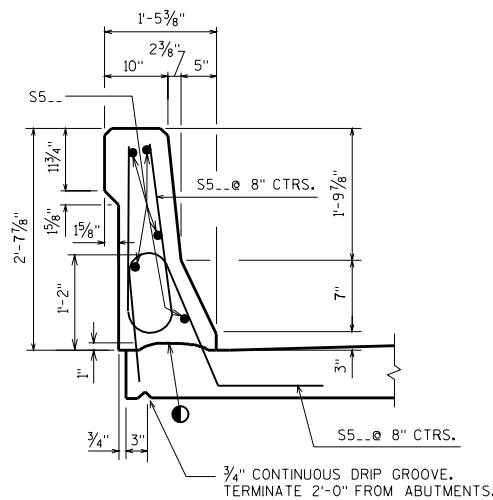


A

B

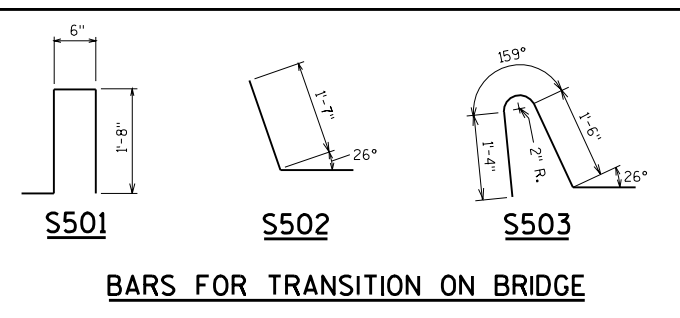
C

OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE

● CONST. JOINT - STRIKE OFF AS SHOWN.



S501

S502

S503

BARS FOR TRANSITION ON BRIDGE

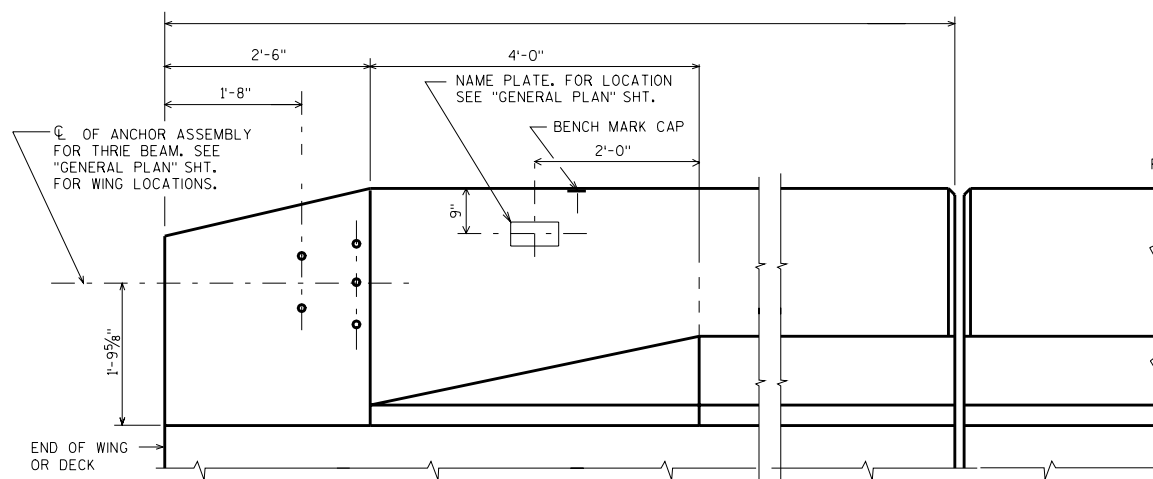
AREA = 2.58 FT.²
WEIGHT = 387 LBS./FT.

SLOPED FACE PARAPET 'LF'

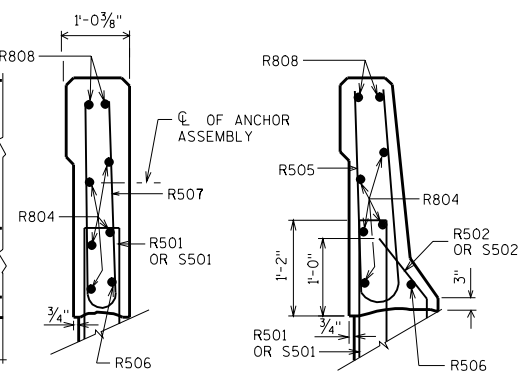
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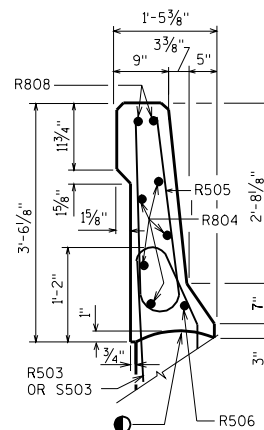


INSIDE ELEVATION



SECTION A

SECTION B



SECTION C

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

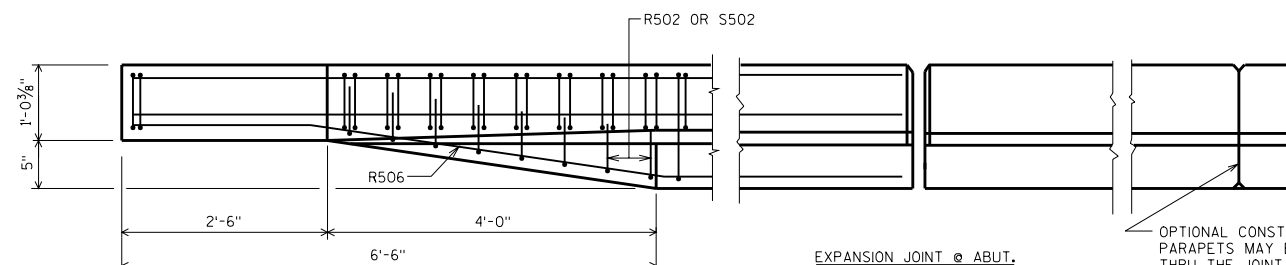
BILL OF BARS

FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BENT	BAR SERIES	LOCATION
R501	X			4'-7"	X		PARAPET VERT.
R502	X			2'-4"	X		PARAPET VERT.
R503	X			4'-6"	X		PARAPET VERT.
R804	X						PARAPET HORIZ.
R505	X			6'-6"	X		PARAPET VERT.
R506	X				X		PARAPET HORIZ.
R507	X			5'-8"	X	▲	PARAPET VERT.
R808	X				X		PARAPET HORIZ.
S501	X			4'-5"	X		PARAPET VERT.
S502	X			2'-4"	X		PARAPET VERT.
S503	X			4'-2"	X		PARAPET VERT.

BAR SERIES TABLE

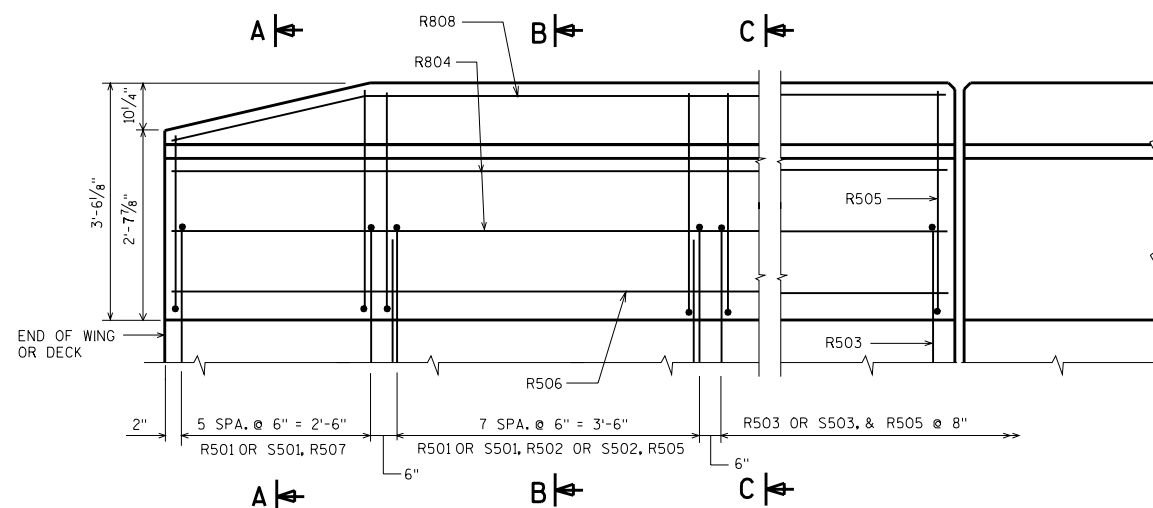
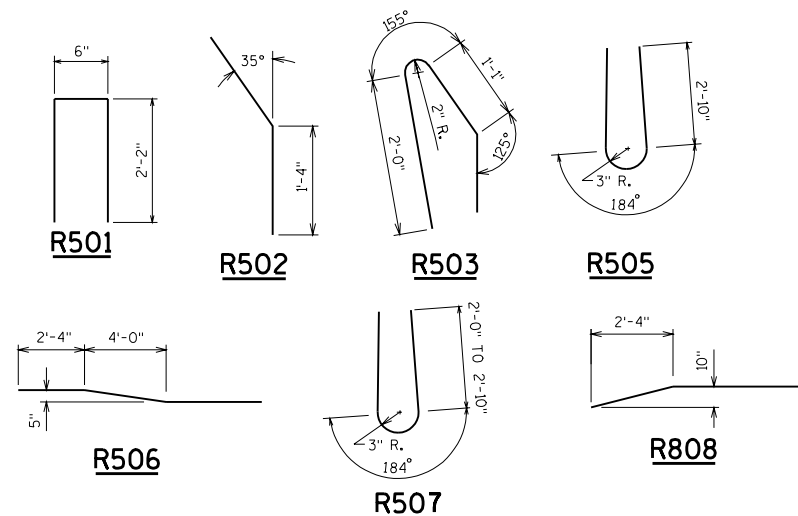
MARK	NO. REQD.	LENGTH
R507	4 SERIES OF 6	4'-10" TO 6'-6"



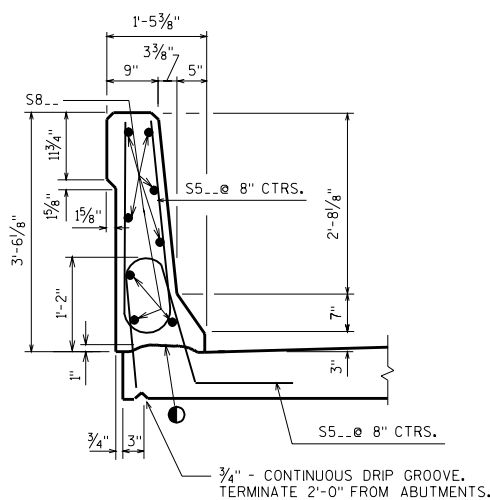
PLAN

EXPANSION JOINT @ ABUT.
0° SKEW SHOWN. MATCH EXP. JT. OPENING.
FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET. SEE STD. 12.1.

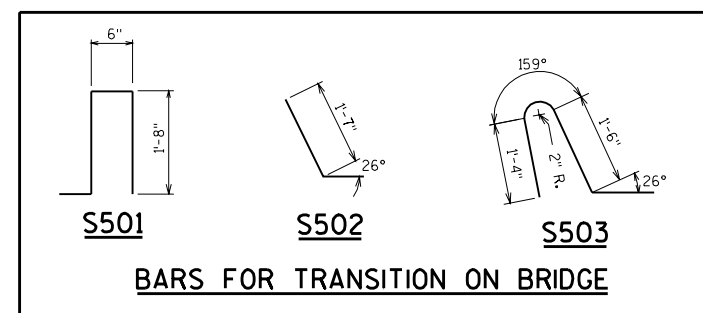
OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 3'-5". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 'V' GROOVE.



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE



BARS FOR TRANSITION ON BRIDGE

AREA = 3.16 FT.²
WEIGHT = 474 LBS./FT.

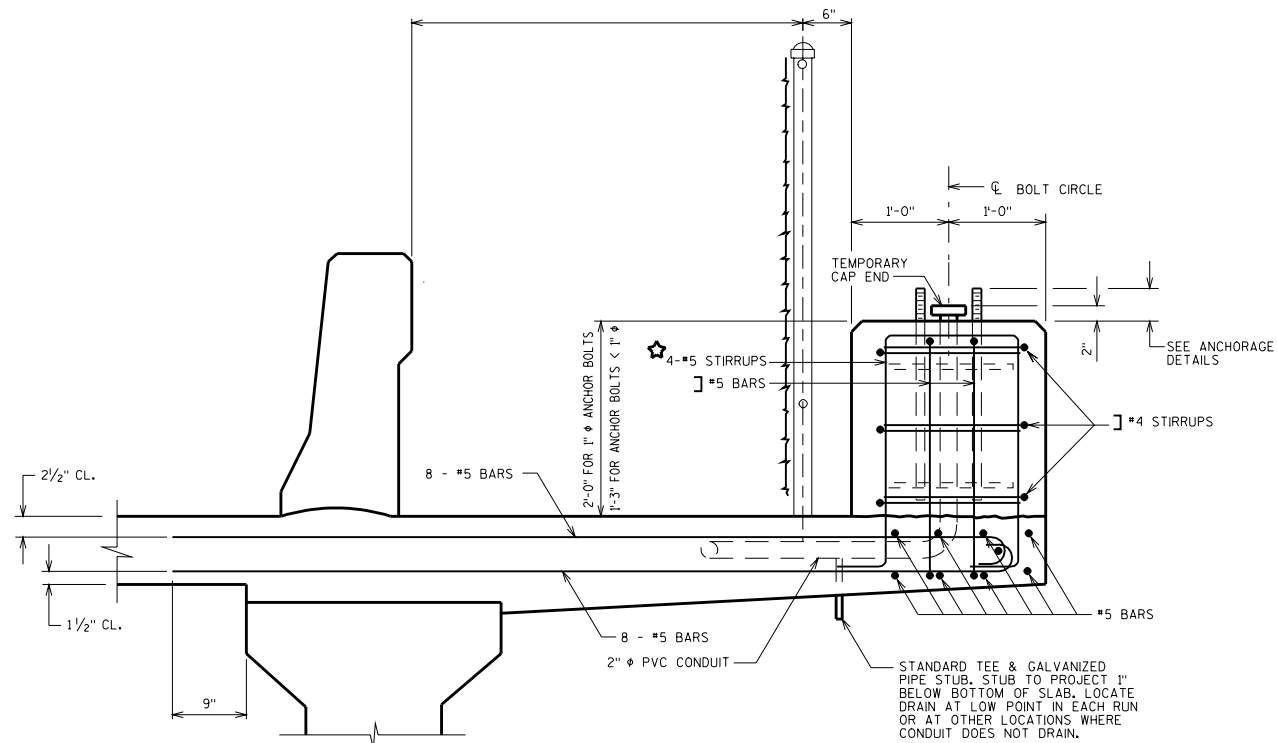
● CONST. JOINT - STRIKE OFF AS SHOWN.

SLOPED FACE PARAPET 'HF'

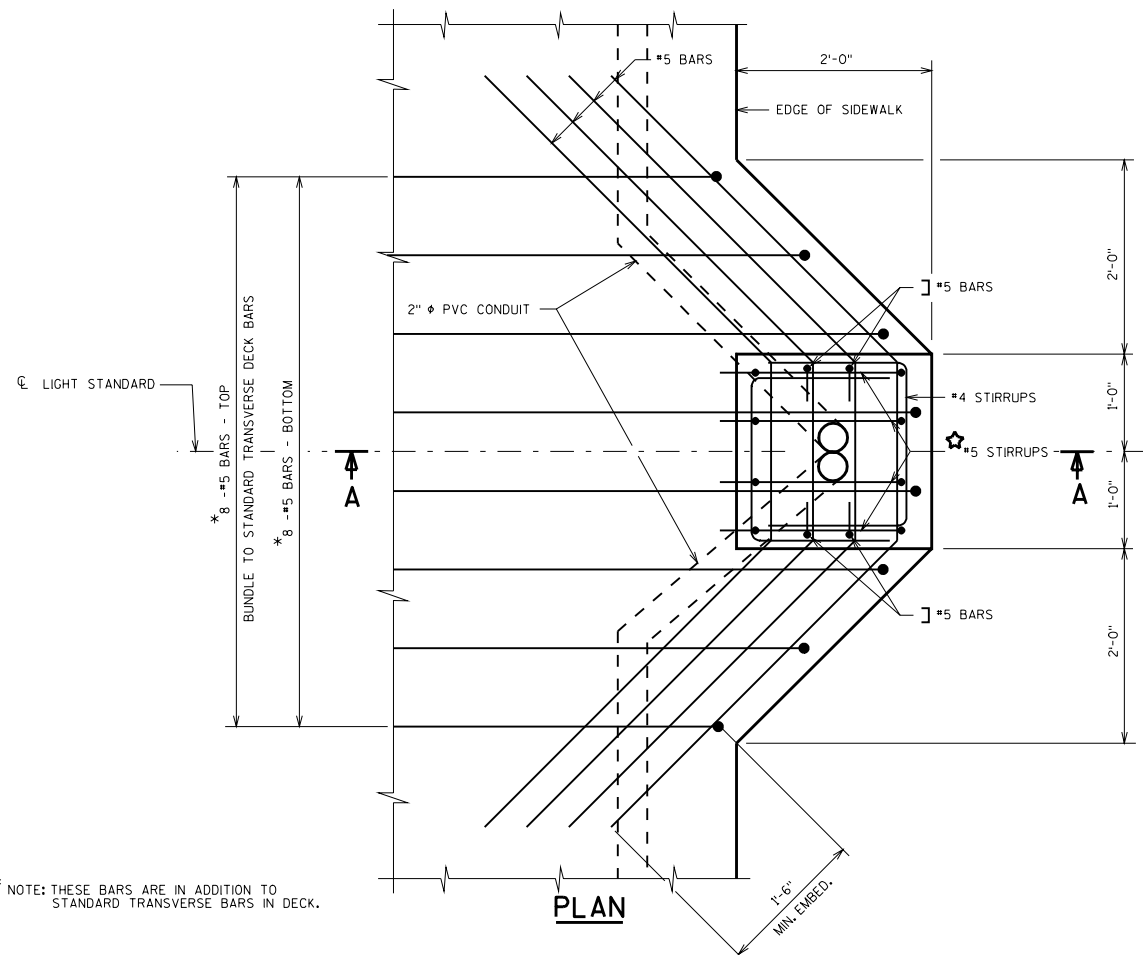
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★ TIE IN PLACE AFTER ANCHOR BOLT ASSEMBLY LOCATED.



* NOTE: THESE BARS ARE IN ADDITION TO STANDARD TRANSVERSE BARS IN DECK.

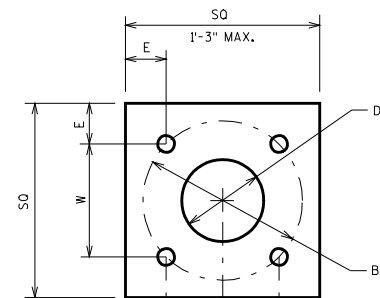
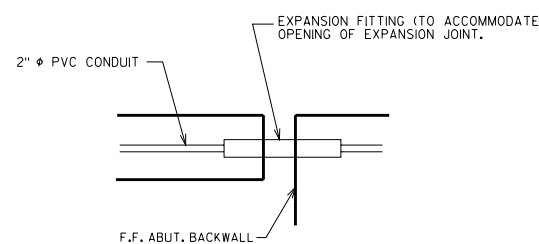
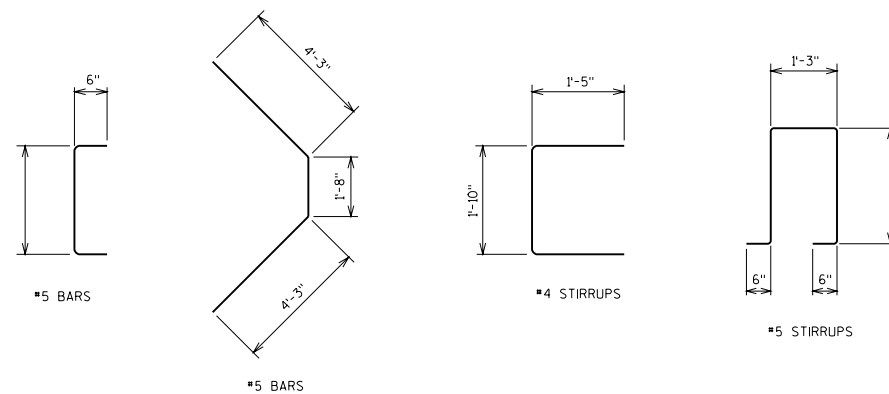
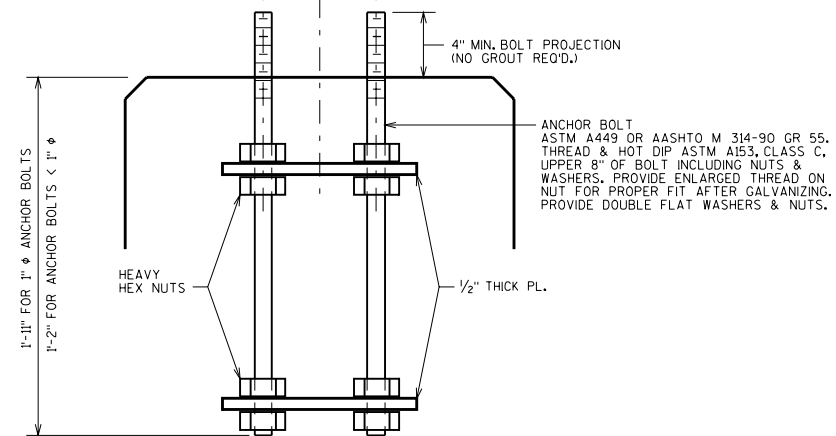


TABLE FOR "TYPE 5 LIGHT POLE" FROM FACILITIES DEV. MANUAL WITH 1" ϕ ANCHOR BOLTS. (ANY OTHER LIGHT POLE TYPE MUST BE DESIGNED FOR.)

SQ	1'-1 1/2"
E	2 5/8"
W	8 7/8"
BC	11 1/2"
D	9 1/2"

W = 0.707 x BC
SQ = BC + 2d
d = ANCHOR BOLT DIA.
E = (SQ - W) / 2
D_{MAX} = BC - 2d
D_{MIN} = 2 X CONDUIT DIA. + 1"



TO BE INCIDENTAL TO BID ITEM, "NON-METALLIC CONDUIT, SCHEDULE 40, 2".

GENERAL NOTES

ALL BARS TO BE EPOXY COATED.

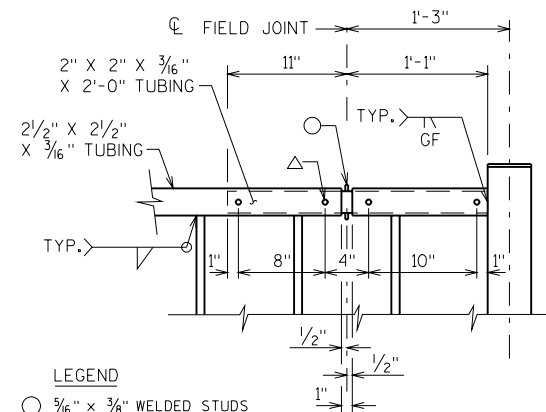
THIS STANDARD IS DESIGNED TO ACCOMMODATE 4 ANCHOR BOLTS OF A MAXIMUM DIAMETER OF 1".

ANCHORAGE TO BE PAID FOR AS "ANCHOR ASSEMBLY LIGHT POLES" EA.

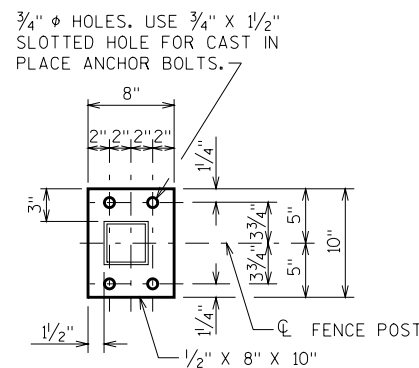
LIGHTING DETAIL

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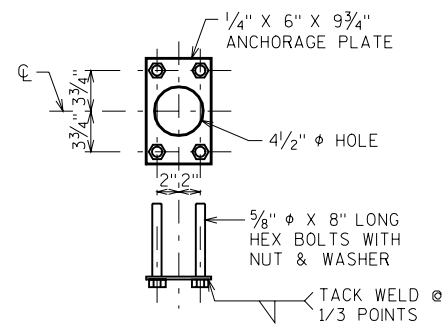
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RAILING EXPANSION JOINT DETAIL

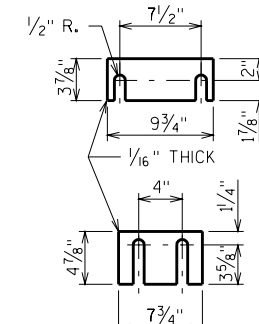


BASE PLATE



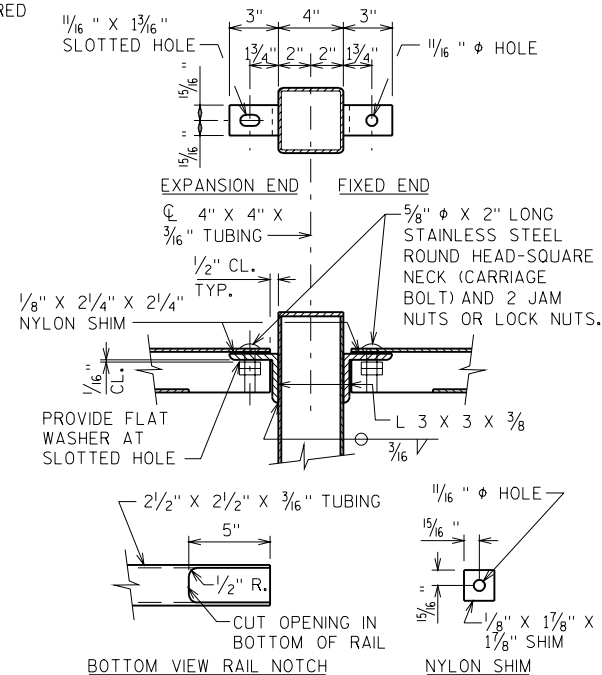
ANCHORAGE DETAIL

$\frac{5}{8}$ " ϕ CONCRETE MASONRY ANCHOR, TYPE S EPOXY, 7" MINIMUM EMBEDMENT WITH A MINIMUM PULLOUT OF 20 KIPS MAY BE SUBSTITUTED FOR $\frac{5}{8}$ " CAST IN PLACE ANCHOR BOLTS. ANCHORAGE PLATE NOT REQUIRED WHEN TYPE S ANCHORS ARE USED.

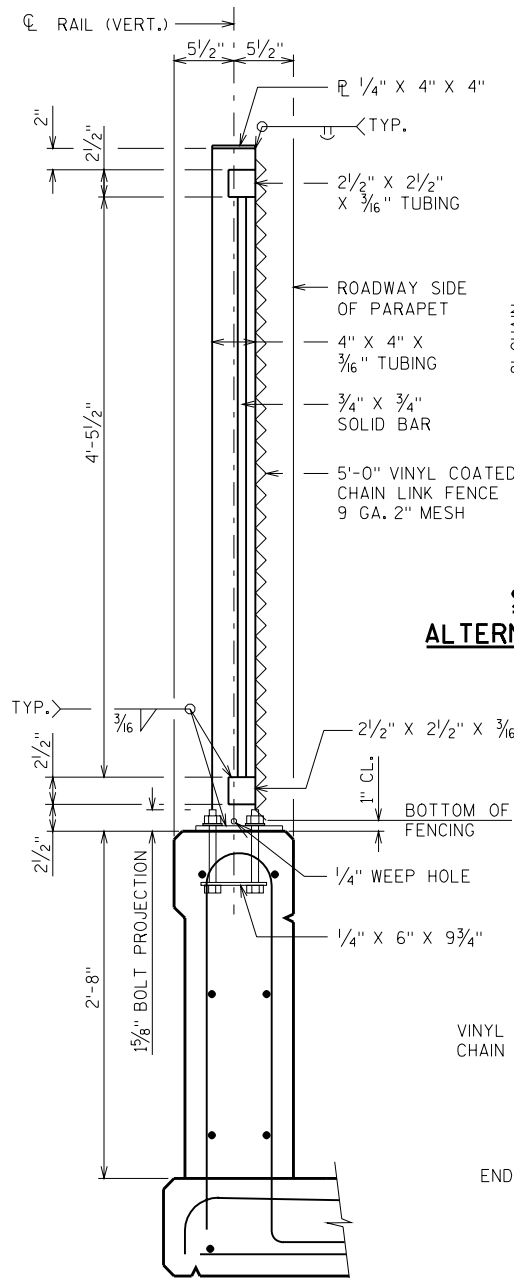


SHIM PLATE DETAILS

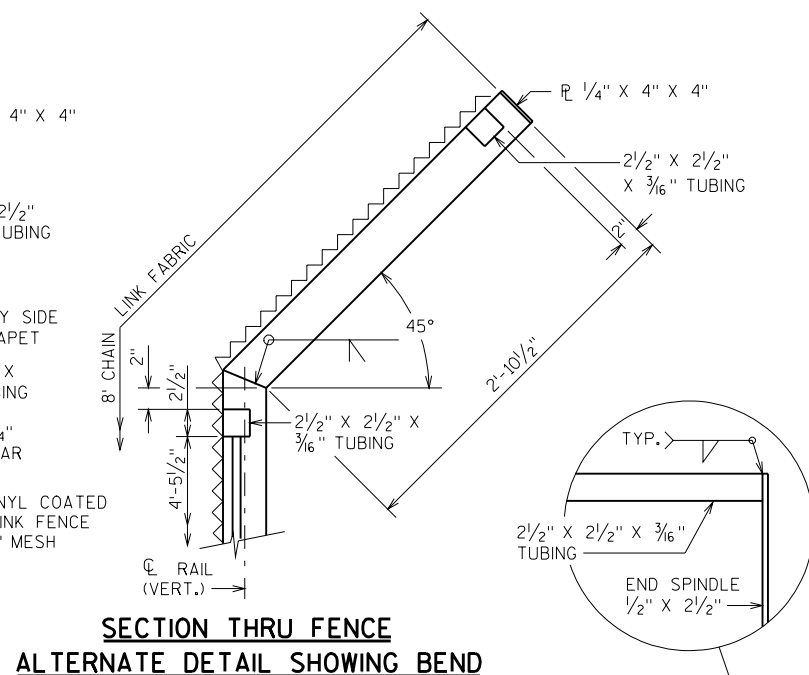
TWO SHIMS OF EACH SIZE REQUIRED PER POST



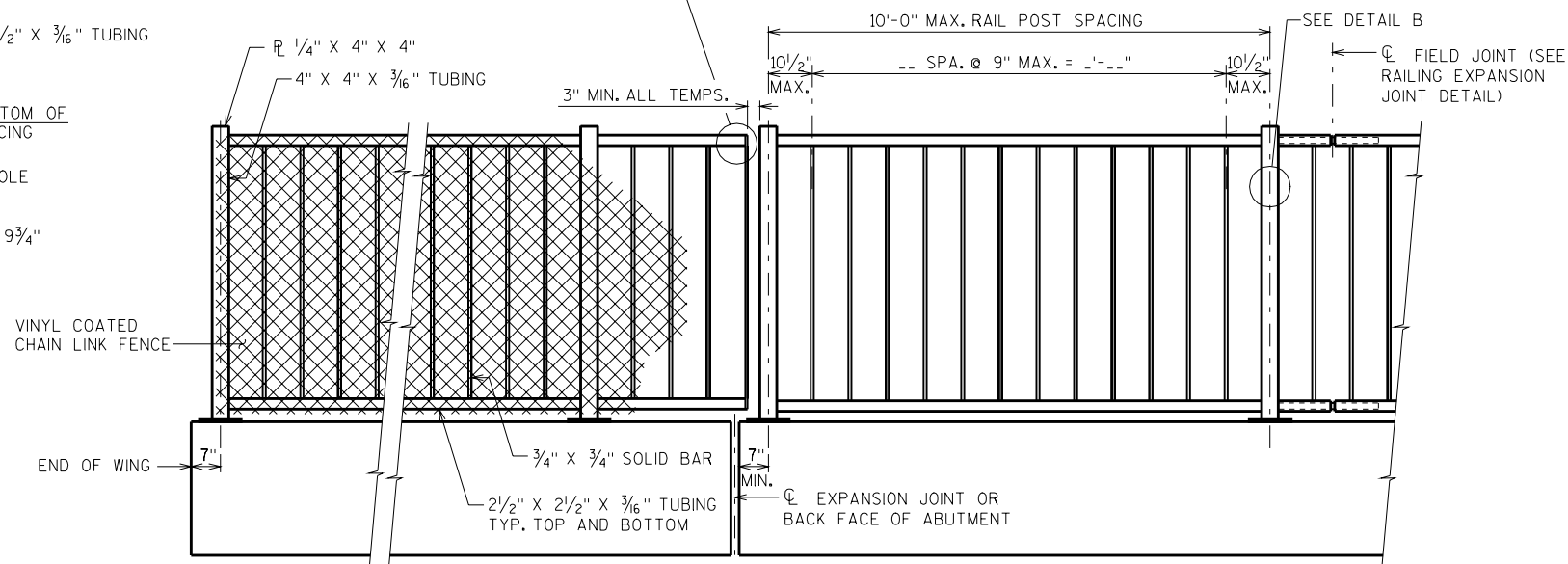
TOP RAIL CONNECTION FOR ALTERNATE DETAIL



SECTION THRU RAILING



SECTION THRU FENCE ALTERNATE DETAIL SHOWING BEND



INSIDE ELEVATION OF RAILING

NOTES

ORNAMENTAL PROTECTIVE SCREENING MAY BE USED ON STRUCTURES WITH A 45 M.P.H. SPEED LIMIT OR LESS, OR, WHEN THE SIDEWALK IS SEPARATED FROM THE ROADWAY BY A PARAPET.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

RAILS AND POSTS TO BE A.S.T.M. A500, GRADE B. BASE PLATES AND SHIMS TO BE A.S.T.M. A709, GRADE 36. ALL GALVANIZED AFTER FABRICATION.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET POSTS NORMAL TO GRADE.

ALL POST SPA. ARE TAKEN HORIZ. ALONG CENTER LINE OF RAILING AT BASE OF POST.

SHIMS SHALL BE USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT.

CAULK AROUND PERIMETER OF BASE PLATES AND FILL PORTION OF SLOTTED HOLES AROUND ANCHOR BOLTS WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

CUT BOTTOM OF POST TO MAKE VERTICAL IN TRANSVERSE DIRECTION.

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR A.S.T.M. 307. IF 307 IS USED, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.

RAILING TO BE PAINTED AND CHAIN LINK FENCE AND TIES TO BE VINYL COATED. FEDERAL COLOR NO.

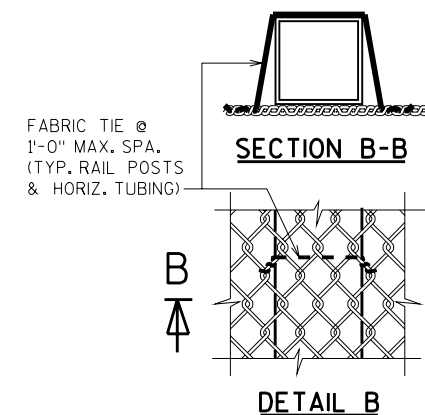
THE BID ITEM SHALL BE "TUBULAR RAILING, SPECIAL" WHICH SHALL INCLUDE ALL ITEMS SHOWN.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE NOT MORE THAN 3 POSTS.

THE END OF THE FABRIC SHALL BE ATTACHED TO THE POST BY MEANS OF A STRETCHER BAR THREADED THROUGH THE END LOOPS OF THE FABRIC AND SECURED TO THE POST WITH CLAMPS & BOLT. THE FABRIC SHALL BE STRETCHED TO REMOVE ALL SLACK.

VENT HOLES SHALL BE DRILLED IN MEMBERS AS REQUIRED TO FACILITATE GALVANIZING.

ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING ALL STEEL RAILING POSTS AND STEEL TUBING SHALL BE GIVEN A #6 BLAST CLEANING BY SSPC SPECIFICATIONS.

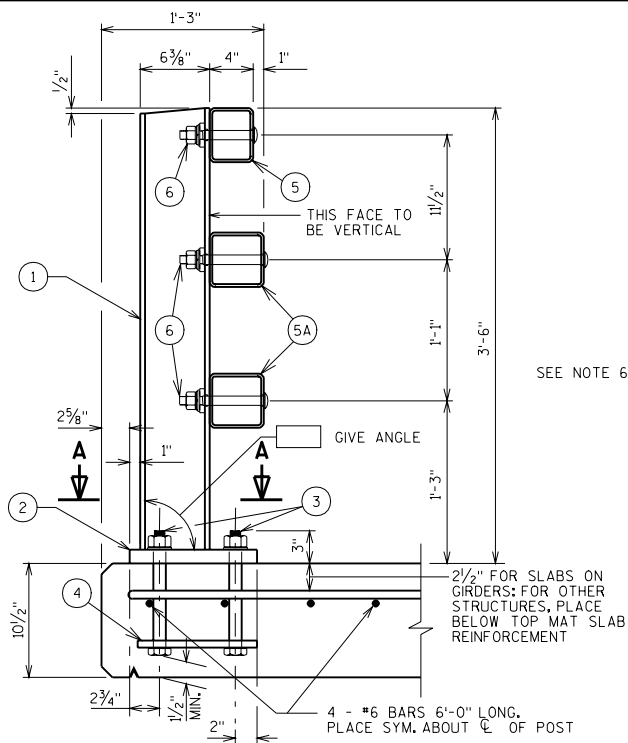


ORNAMENTAL PROTECTIVE SCREENING

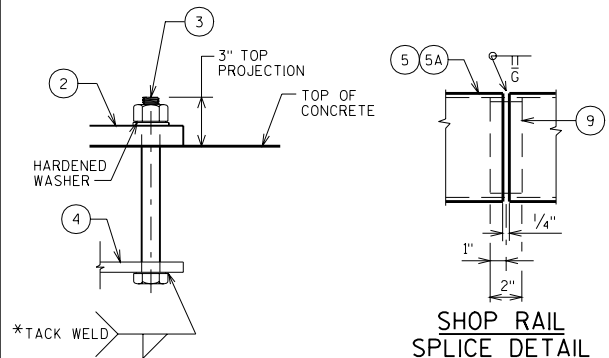
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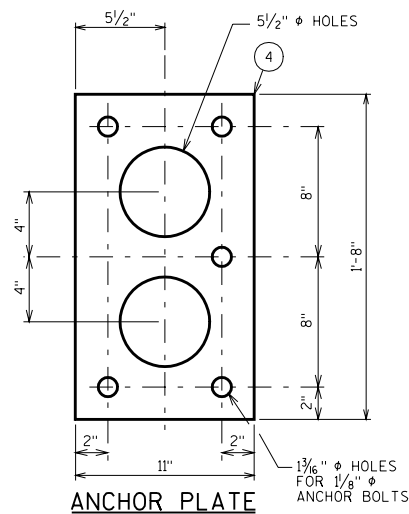


SECTION THRU RAILING ON DECK

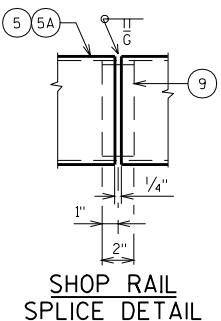


ANCHOR BOLTS

*FOR ANCHOR BOLTS IN WINGS, TACK WELD MAY BE USED IN FIELD AFTER ANCHOR PLATE IS IN POSITION IF REQ'D. FOR CONSTRUCTIBILITY.

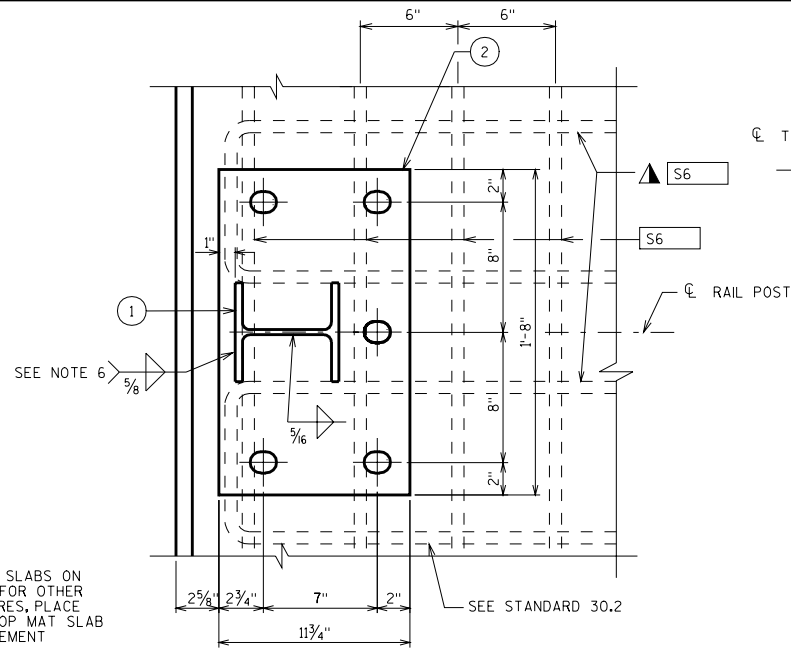


ANCHOR PLATE

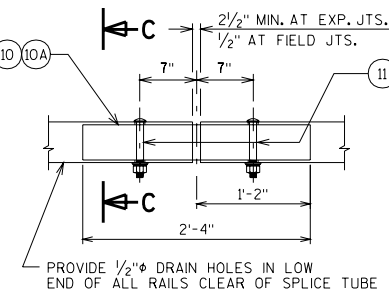


SHOP RAIL SPLICE DETAIL

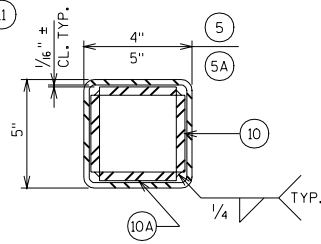
(LOCATION MUST BE SHOWN ON SHOP DRAWINGS)



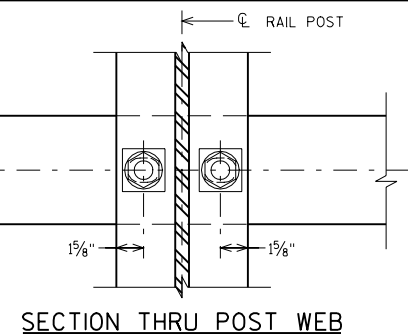
SECTION A



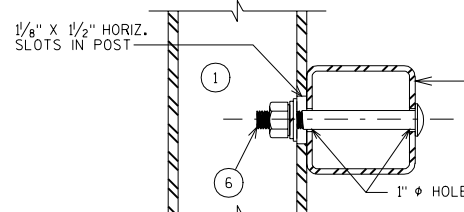
FIELD ERECTION JOINT DETAIL



SECTION C



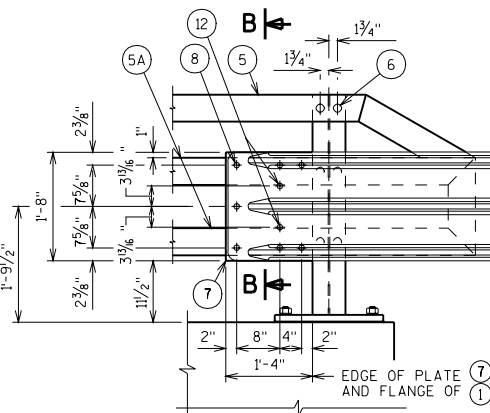
SECTION THRU POST WEB



SECTION THRU RAIL

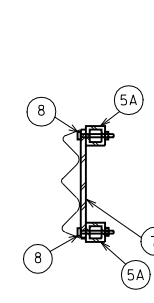
NOTE: CONNECTIONS AT LOWER RAILS SHOWN. CONNECTIONS AT TOP RAIL SIMILAR.

TYPICAL RAIL TO POST CONNECTIONS

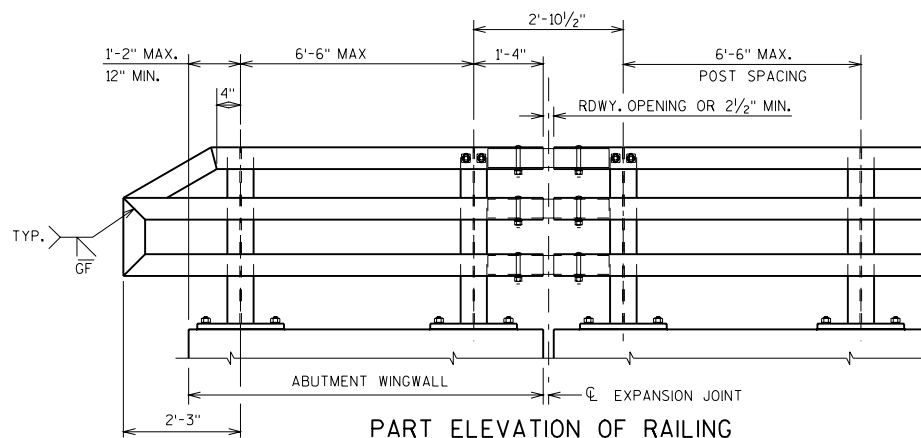


DETAIL AT END POST

(THREE BEAM RAIL ATTACHMENT)



SECTION B



PART ELEVATION OF RAILING

LEGEND

- W6 x 25 WITH 1/4" x 1 1/2" HORIZONTAL SLOTS ON EACH SIDE OF POST FOR BOLT NO. 6. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- PLATE 1/4" x 11 3/4" x 1'-8" WITH 1 1/8" x 1 1/8" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE
- ASTM A449 - 1/8" DIA. ANCHOR BOLTS WITH NUT AND HARDENED WASHER (ALL GALVANIZED), 5 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE 1'-9" LONG IN ABUTMENT WINGS. AT POSTS ON CONCRETE SLAB SUPERSTRUCTURES WHERE THE SLAB THICKNESS IS > 16" USE 1'-3" LONG. USE 10 3/4" LONG AT ALL OTHER LOCATIONS. (AN EQUIVALENT THREADED ROD WITH NUTS AND HARDENED WASHERS MAY BE SUBSTITUTED FOR ANCHOR BOLTS IN WINGS IF REQ'D. FOR CONSTRUCTIBILITY.)
- 5/8" x 11" x 1'-8" ANCHOR PLATE (GALVANIZED) WITH 1 1/8" DIA. HOLES FOR ANCHOR BOLTS NO. 3
- TS 5 x 4 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- TS 5 x 5 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- 7/8" DIA. A325 ROUND HEAD BOLT WITH NUT, 3/8" x 1 1/8" x 1 1/8" WASHER, AND LOCK WASHER (2 REQ'D. AT EACH RAIL TO POST LOCATION.)
- PLATE 3/8" x 1'-4" x 1'-8". BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5A.
- 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5A FOR 7/8" DIA. A325 BOLTS WITH HEX NUTS AND WASHERS. 6 HOLES IN TUBES AND PLATE NO. 7.
- SPLICE SLEEVE FABRICATED FROM 1/4" PLATE. PROVIDE "SLIDING FIT".
- 3/8" x 3 3/8" x 2'-4" PLATE. 2 PER RAIL. USED IN NO. 5 & 5A.
- 3/8" x 2 3/8" x 2'-4" PLATE USED IN NO. 5. 3/8" x 3 3/8" x 2'-4" PLATE USED IN NO. 5A. 2 PER RAIL.
- 7/8" DIA. A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER. USE 5/8" x 1 1/4" LONGIT. SLOTTED HOLES AT FIELD JOINTS AND 1 1/8" x 2 1/4" MIN. LONGIT. SLOTTED HOLES AT EXP. JOINTS IN PLATE NO. 10A.
- 7/8" DIA. x 1 1/2" LONG THREADED SHOP WELDED STUDS (3 REQ'D).

▲ TIE TO TOP MAT OF STEEL.

GENERAL NOTES

- BID ITEM SHALL BE "TUBULAR RAILING TYPE "M" WHICH INCLUDES ALL ITEMS SHOWN.
- RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED FY = 50 KSI. ANCHOR PLATES, AND SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 36.
- THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL 1/8 TURN.
- RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF FOUR (4) POSTS WITHOUT SPLICES WHERE POSSIBLE. RAILS SHALL BE SPLICED IN A PANEL OVER EXPANSION JOINTS.
- ENDS OF TUBE SECTIONS SHALL BE SAWED. GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
- WELD IS THE SAME ON BOTH FLANGES. FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING.
- FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 AND CAULK AROUND PERIMETER OF PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQ'D. FOR ALIGNMENT.
- POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH. STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
- FOR RAILING NOT TO BE PAINTED, ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.
- FOR RAILING TO BE PAINTED, ALL MATERIAL EXCEPT ANCHORAGE DETAIL (NO. 3 & 4) SHALL BE PAINTED WITH A THREE-COAT ZINC RICH EPOXY SYSTEM. PRIOR TO PAINTING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 11 NEAR WHITE BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.
- THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 4 (TL-4).

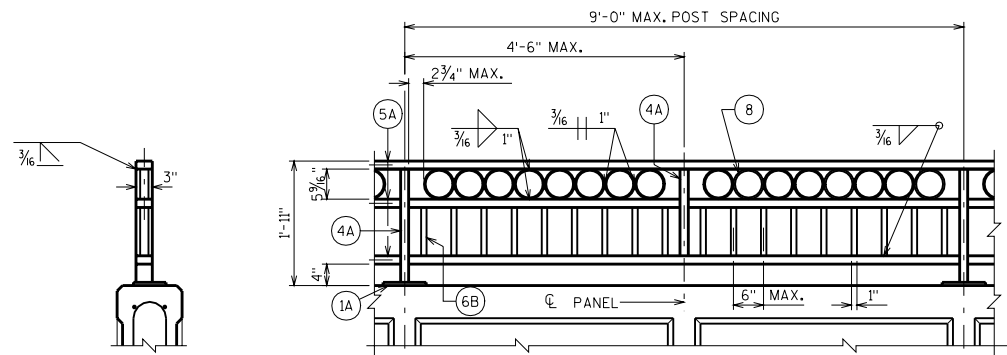
TUBULAR STEEL RAILING TYPE "M"

STATE OF WISCONSIN
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STRUCTURES DEVELOPMENT SECTION

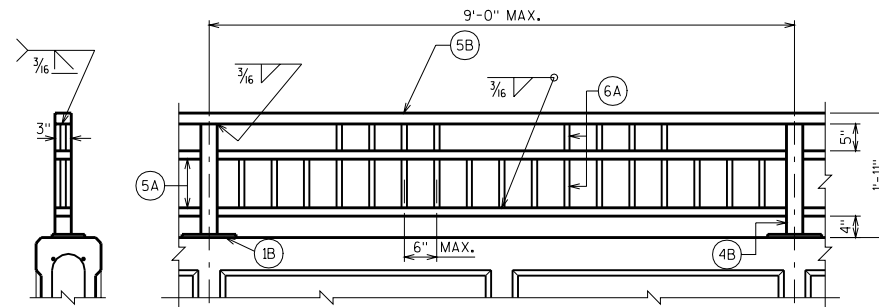
APPROVED: _____

DATE:

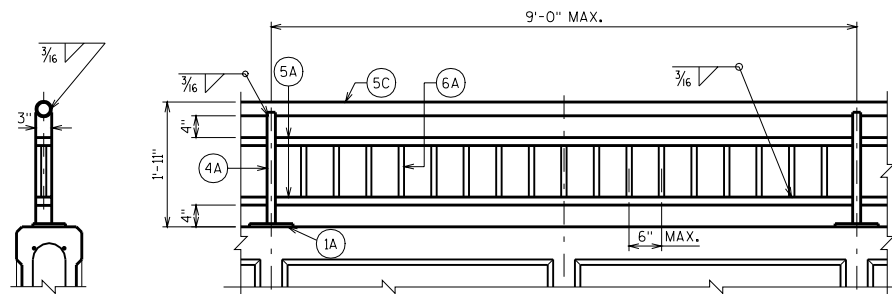
1/03



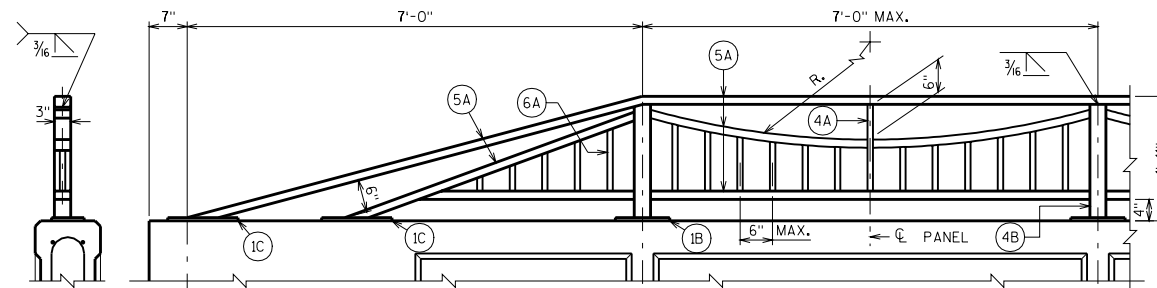
TYPE C1



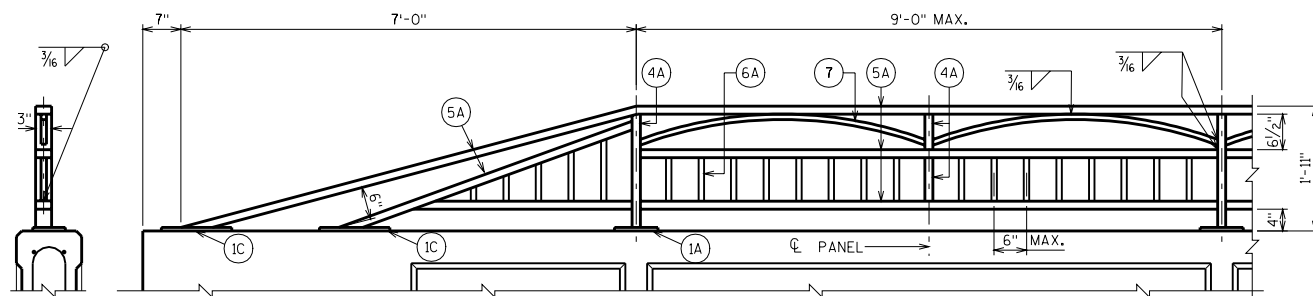
TYPE C4



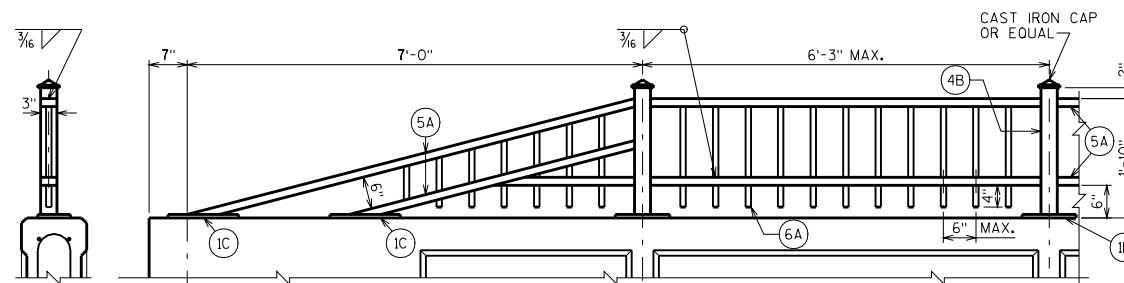
TYPE C2



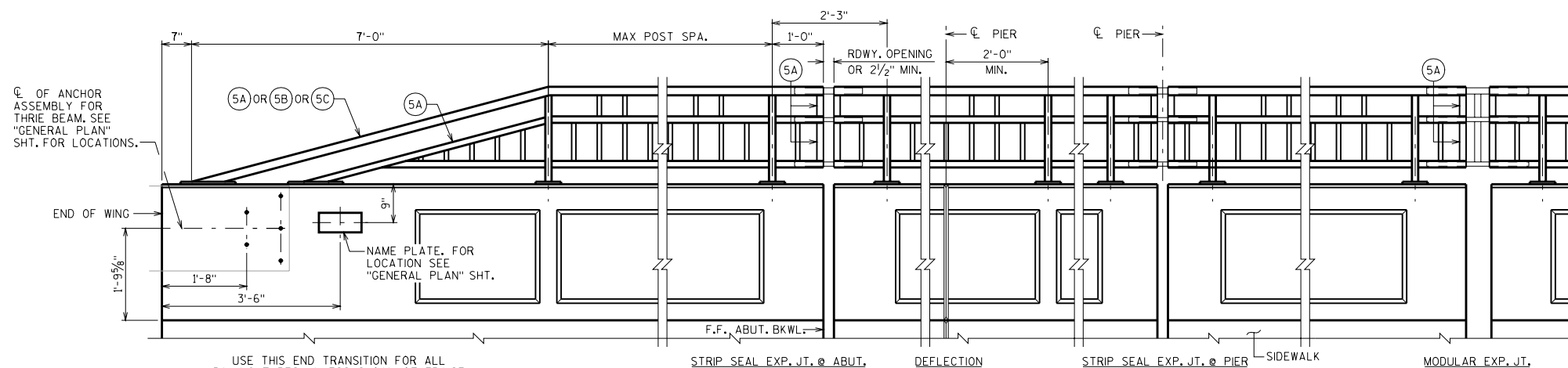
TYPE C5



TYPE C3



TYPE C6



INSIDE ELEVATION

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 2'-3". DEFINE CONSTR. JT. WITH A 3/4" V-GROOVE.

COMBINATION RAILINGS REQUIRE A MIN. 13'-0" WING LENGTH TO ACCOMMODATE END TRANSITION.

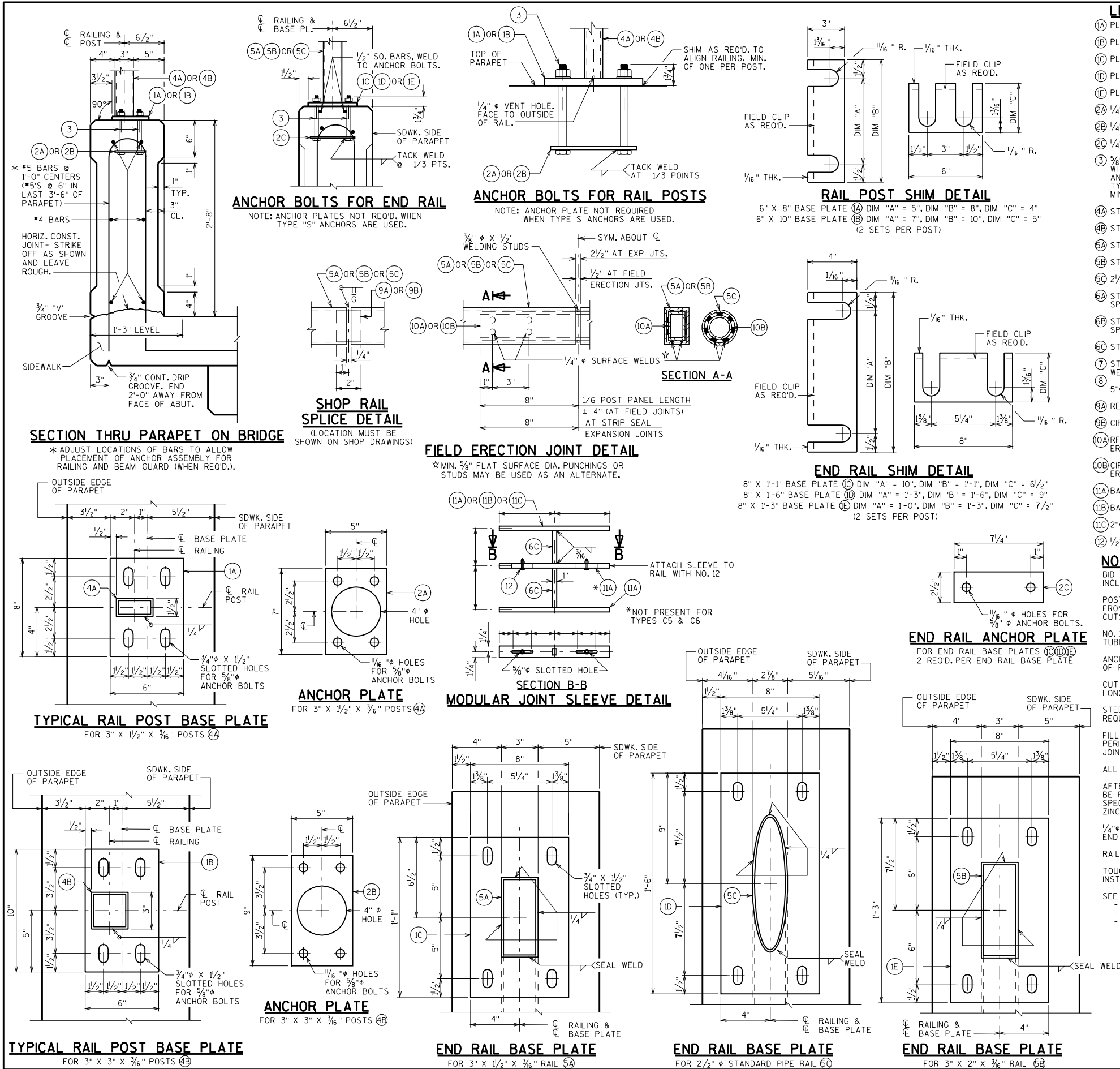
SEE STANDARD 30.18 FOR RAILING DETAILS

**COMBINATION RAILING
TYPES "C1 - C6"**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1-02



LEGEND

- (1A) PLATE 5/8" X 6" X 8" WITH 3/4" X 1/2" SLOTTED HOLES.
(1B) PLATE 5/8" X 6" X 10" WITH 3/4" X 1/2" SLOTTED HOLES
(1C) PLATE 5/8" X 8" X 1'-1" WITH 3/4" X 1/2" SLOTTED HOLES.
(1D) PLATE 5/8" X 8" X 1'-6" WITH 3/4" X 1/2" SLOTTED HOLES
(1E) PLATE 5/8" X 8" X 1'-3" WITH 3/4" X 1/2" SLOTTED HOLES
(2A) 1/4" X 5" X 7" ANCHOR PLATE WITH 1/16" Holes FOR ANCHOR BOLTS NO. 3.
(2B) 1/4" X 5" X 9" ANCHOR PLATE WITH 1/16" Holes FOR ANCHOR BOLTS NO. 3.
(2C) 1/4" X 2 1/2" X 7 1/4" ANCHOR PLATE WITH 1/16" Holes FOR ANCHOR BOLTS NO. 3.
(3) 5/8" DIA. X 7 1/2" LONG ASTM F593 TYPE 316 STAINLESS STEEL ANCHOR BOLTS WITH NUT AND WASHERS OF SAME ALLOY GROUP. (ALTERNATE RAIL POST ANCHORAGE: 3/4" EQUIV. STAINLESS STEEL CONCRETE MASONRY ANCHORS, TYPE S (EPOXY), 5/8" MINIMUM PULLOUT CAPACITY OF 15 KIPS. EMBED A MIN. OF 7" FOR RAIL POSTS AND 5" FOR END RAILS.)
(4A) STRUCTURAL TUBING 3" X 1 1/2" X 3/16". PLACE VERTICAL. WELD TO NO. 1 & 5.
(4B) STRUCTURAL TUBING 3" X 3" X 3/16". PLACE VERTICAL. WELD TO NO. 1 & 5.
(5A) STRUCTURAL TUBING 3" X 1 1/2" X 3/16" RAILS. WELD TO NO. 1 & NO. 4.
(5B) STRUCTURAL TUBING 3" X 2" X 3/16" RAILS. WELD TO NO. 1 & NO. 4.
(5C) 2 1/2" STANDARD PIPE RAIL (2.875" O.D.). WELD TO NO. 1 & NO. 4.
(6A) STRUCTURAL TUBING 1" X 1" X 1/8" PICKETS. WELD TO NO. 5. SPACE AT 6" MAX. TO CL SPACING. PLACE VERTICAL.
(6B) STRUCTURAL TUBING 1" X 1 1/2" X 1/8" PICKETS. WELD TO NO. 5. SPACE AT 6" MAX. TO CL SPACING. PLACE VERTICAL.
(6C) STRUCTURAL TUBING 1" X 1 1/2" X 1/8" PICKETS. WELD TO NO. 11. PLACE VERTICAL.
(7) STRUCTURAL TUBING 1" X 1" X 1/8". BEND TO REQUIRED RADIUS.
(8) 5" SCH. 40 PIPE (5 5/8" O.D.) 1/2" LONG SLICES. WELD TO NO. 5A.
(9A) RECTANGULAR SLEEVE FABRICATED FROM 3/8" PLATES. PROVIDE "SLIDING FIT".
(9B) CIRCULAR SLEEVE FABRICATED FROM 2" STANDARD PIPE.
(10A) RECTANGULAR SLEEVE FABRICATED FROM 3/8" PLATES. (1'-4" @ FIELD ERECTION JTS.) (1'-4" @ STRIP SEAL EXP. JTS.)
(10B) CIRCULAR SLEEVE FABRICATED FROM 2" STANDARD PIPE. (1'-4" @ FIELD ERECTION JTS.) (1'-4" @ STRIP SEAL EXP. JTS.)
(11A) BAR 2 1/2" X 1" X 1/2".
(11B) BAR 2 1/2" X 1 1/2" X 1/2".
(11C) 2" STANDARD PIPE X 1/2".
(12) 1/2" DIA. STAINLESS STEEL BOLT WITH NUT AND LOCKWASHER.

NOTES

BID ITEM SHALL BE "COMBINATION RAILING TYPE "C(1-6)" ", WHICH SHALL INCLUDE ALL STEEL ITEMS SHOWN, AND PAINTING.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

NO. 1, 2, 8, 9 AND NO. 10 SHALL CONFORM TO A.S.T.M. A709 GRADE 36. STRUCTURAL TUBING SHALL CONFORM TO A.S.T.M. A500 GRADE B (NO. 4, NO. 5, 6 AND NO. 7).

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET NORMAL TO GRADE.

CUT BOTTOM OF POST TO MAKE POST VERTICAL IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTION.

STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT.

FILL BOLT SLOT OPENINGS IN SHIMS AND PLATE NO. 1 AND CAULK AROUND PERIMETER OF PLATE NO. 1 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ALL JOINTS AND RECESSES IN CONCRETE PARAPET ARE TO BE VERTICAL.

AFTER FABRICATION, ALL MATERIAL, EXCEPT ANCHORAGE (NO. 2 & 3) & SHIMS SHALL BE PAINTED WITH A THREE COAT ZINC-RICH EPOXY SYSTEM PER WISDOT STANDARD SPECIFICATION, SECTION 517, EPOXY SYSTEM. SHIMS SHALL BE GIVEN ONE COAT OF ZINC RICH PRIMER PAINT. THE FINISH COLOR SHALL BE FEDERAL COLOR NO. 1.

1/4" VENT HOLES LOCATED IN TOP RAIL OVER RAIL POSTS AND AT LOW END OF OTHER RAILS.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

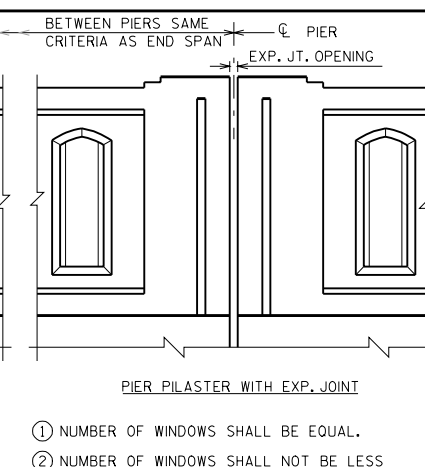
TOUCH-UP PAINTING TO BE DONE AT COMPLETION OF STEEL RAILING INSTALLATION TO THE SATISFACTION OF THE ENGINEER AT NO EXTRA COST.

SEE STD. 30.7 FOR
- DEFLECTION JOINT DETAILS AND NOTES
- BEAM GUARD ANCHOR ASSEMBLY DETAILS
- SIDEWALK REINFORCEMENT AND DETAILS

COMBINATION RAILING DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1-02



- NOTES**
 BID ITEM SHALL BE "VERTICAL FACE PARAPET
 TYPE "TX" ", WHICH SHALL INCLUDE ALL ITEMS
 SHOWN.

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF $\frac{1}{8}$ " ZINC OR ALUMINUM PLATE CUT AS SHOWN ON STANDARD 30.7. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINT, ONE SIDE OF JOINT SHALL BE COATED WITH BITUMINOUS PAINT AND PLATE SEPARATORS MAY BE OMITTED.

ALL REINFORCING STEEL TO BE EPOXY COATED.

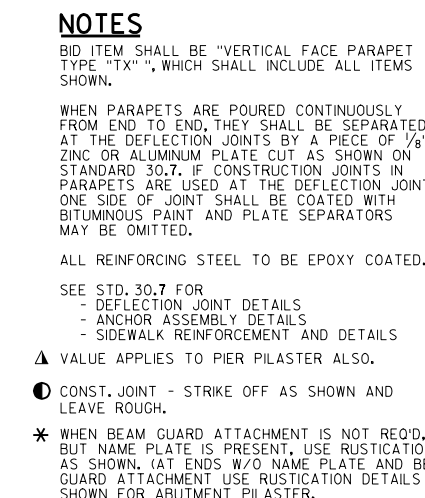
SEE STD. 30.7 FOR

- DEFLECTION JOINT DETAILS
- ANCHOR ASSEMBLY DETAILS
- SIDEWALK REINFORCEMENT AND DETAILS

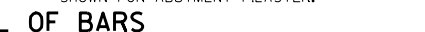
▲ VALUE APPLIES TO PIER PILASTER ALSO.

● CONST. JOINT - STRIKE OFF AS SHOWN AND LEAVE ROUGH.

* WHEN BEAM GUARD ATTACHMENT IS NOT REQ'D, BUT NAME PLATE IS PRESENT, USE RUSTICATION AS SHOWN. (AT ENDS W/O NAME PLATE AND BEAM GUARD ATTACHMENT USE RUSTICATION DETAILS SHOWN FOR ABUTMENT PILEASTER.



SECTION D-D

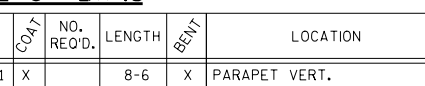


TYPE D

PLAN

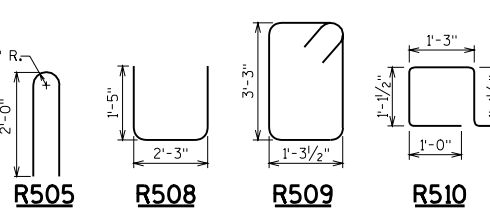
LIGHT STANDARD

SEE STANDARD 30.14 FOR CONDUIT, ANCHORAGE, AND EXP. FITTING DETAILS



BAR MARK	COAT	NO. REQ'D.	LENGTH	BENT	LOCATION
R501	X		8-6	X	PARAPET VERT.
R502	X		3-4	X	PARAPET VERT.
R503	X				PARAPET HORIZ. BOT.
R704	X				PARAPET HORIZ. TOP
R505	X		4-4	X	PARAPET VERT. @ WINGS
R506	X				PARAPET HORIZ. BOT. @ WING
R707	X				PARAPET HORIZ. TOP @ WING
R508	X		4-9	X	PARAPET HORIZ. @ LIGHT ST
R509	X		9-6	X	PARAPET VERT. @ LIGHT ST
R510	X		4-9	X	PARAPET VERT. @ LIGHT ST

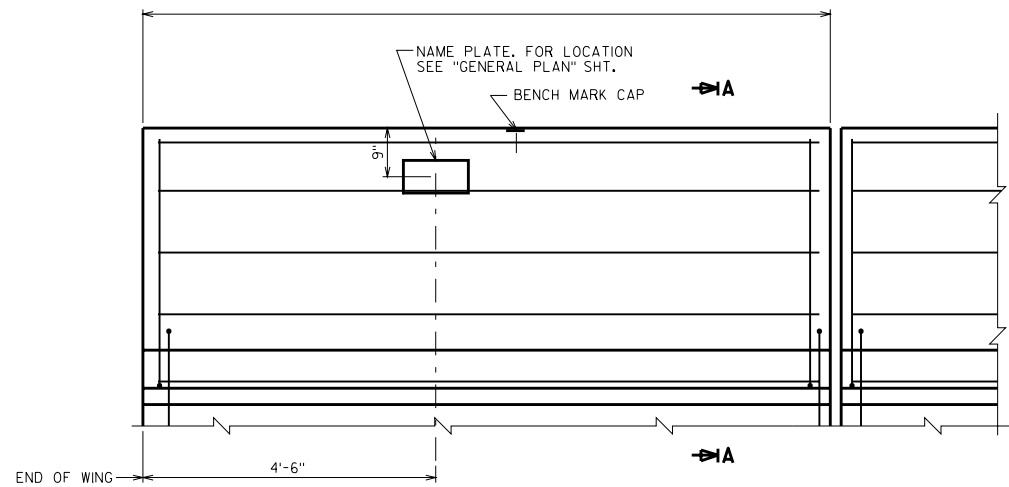
BAR MARK	COAT	NO. REQ'D.	LENGTH	BENT	LOCATION
R501	X		8-6	X	PARAPET VERT.
R502	X		3-4	X	PARAPET VERT.
R503	X				PARAPET HORIZ. BOT.
R704	X				PARAPET HORIZ. TOP
R505	X		4-4	X	PARAPET VERT. @ WINGS
R506	X				PARAPET HORIZ. BOT. @ WING
R707	X				PARAPET HORIZ. TOP @ WING
R508	X		4-9	X	PARAPET HORIZ. @ LIGHT ST
R509	X		9-6	X	PARAPET VERT. @ LIGHT ST
R510	X		4-9	X	PARAPET VERT. @ LIGHT ST



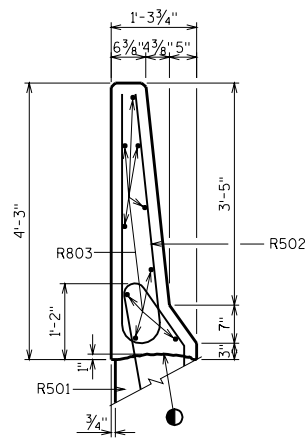
<p style="text-align: center;">VERTICAL FACE PARAPET "TX"</p>	
<p style="text-align: center;">STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION</p>	
<p>APPROVED: _____</p>	<p>DATE: _____ 1-02</p>

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____	DATE: 1-02
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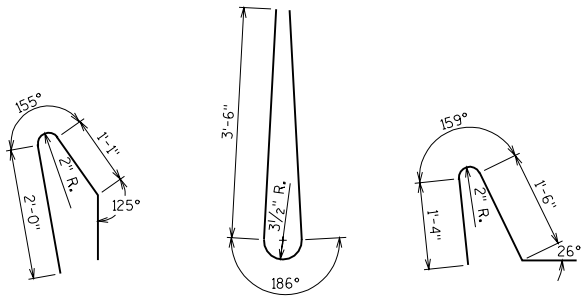
INSIDE ELEVATION



SECTION A

BILL OF BARS FOR ABUTMENT PARAPETS

BAR MARK	COAT	ABUT.	ABUT.	LENGTH	BENT	LOCATION
R501	X			4'-6"	X	PARAPET VERT.
R502	X			7'-11"	X	PARAPET VERT.
R803	X					PARAPET HORIZ.
S5	X			4'-2"	X	PARAPET VERT.
S5	X			7'-11"	X	PARAPET VERT.
S8	X					PARAPET HORIZ.



R501

R502/S5

S5

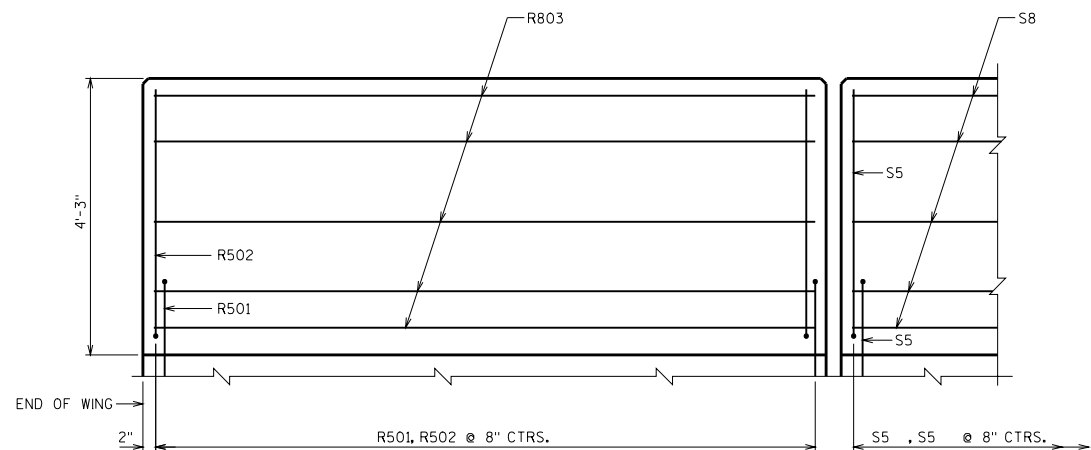


PLAN

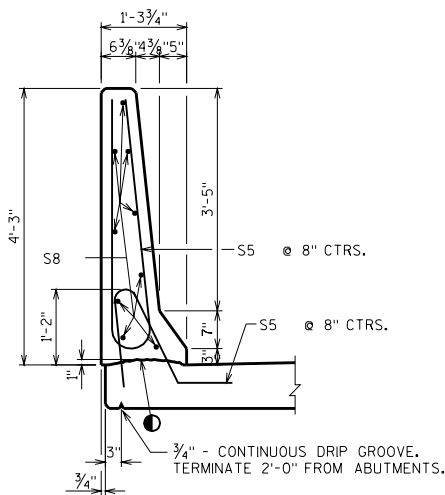
EXPANSION JOINT @ ABUT.
0° SKEW SHOWN. MATCH EXP.
JT. OPENING.

FOR TYPE A1 ABUT., USE 1/2"
FILLER TO TOP OF PARAPET.
SEE STD. 12.1.

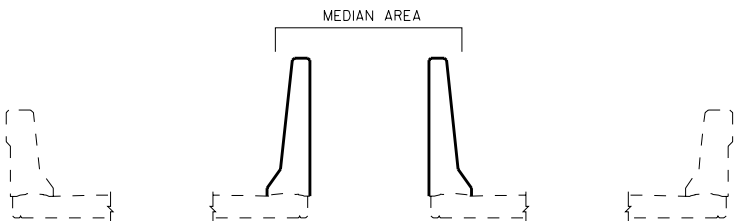
OPTIONAL CONSTRUCTION JOINTS IN THE
PARAPETS MAY BE USED. RUN BAR REINF.
THRU THE JOINT. LAP LONGIT. BARS A
MIN. OF 3'-7". MIN. JOINT SPACING OF
80'-0". DEFINE CONST. JOINT WITH A
3/4" - 1" GROOVE.



OUTSIDE ELEVATION



SECTION THRU PARAPET ON BRIDGE



SLOPED FACE PARAPET "51F" MAY BE USED IN MEDIAN AREA
OF ADJACENT STRUCTURES WHEN HIGHWAY MEDIAN APPROACH
CONCRETE BARRIER IS 51" HIGH

CONST. JOINT - STRIKE OFF AS SHOWN.

AREA = 3.41 FT.²
WEIGHT = 512 LBS./FT.

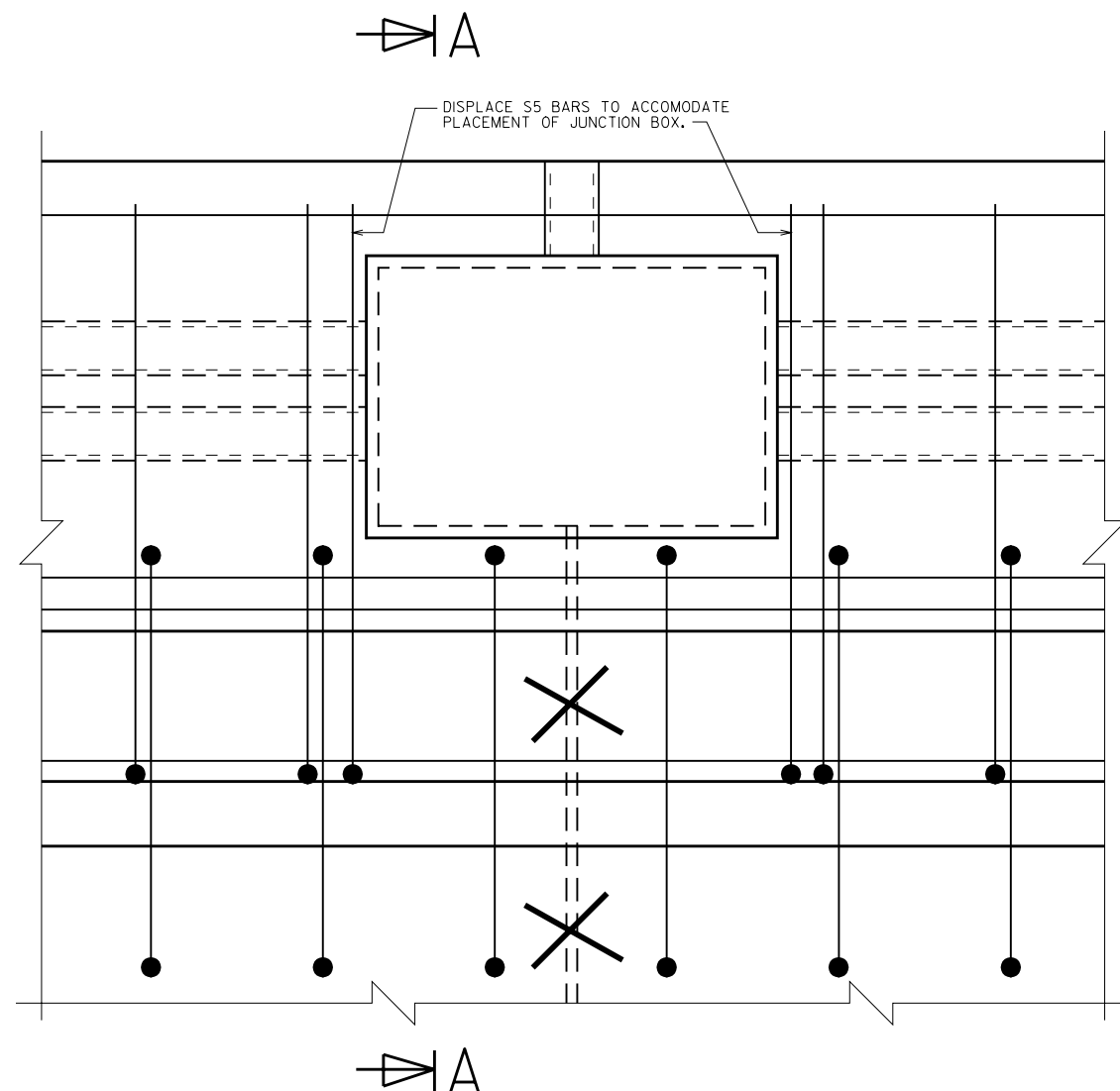
SLOPED FACE PARAPET "51F"

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
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APPROVED: _____

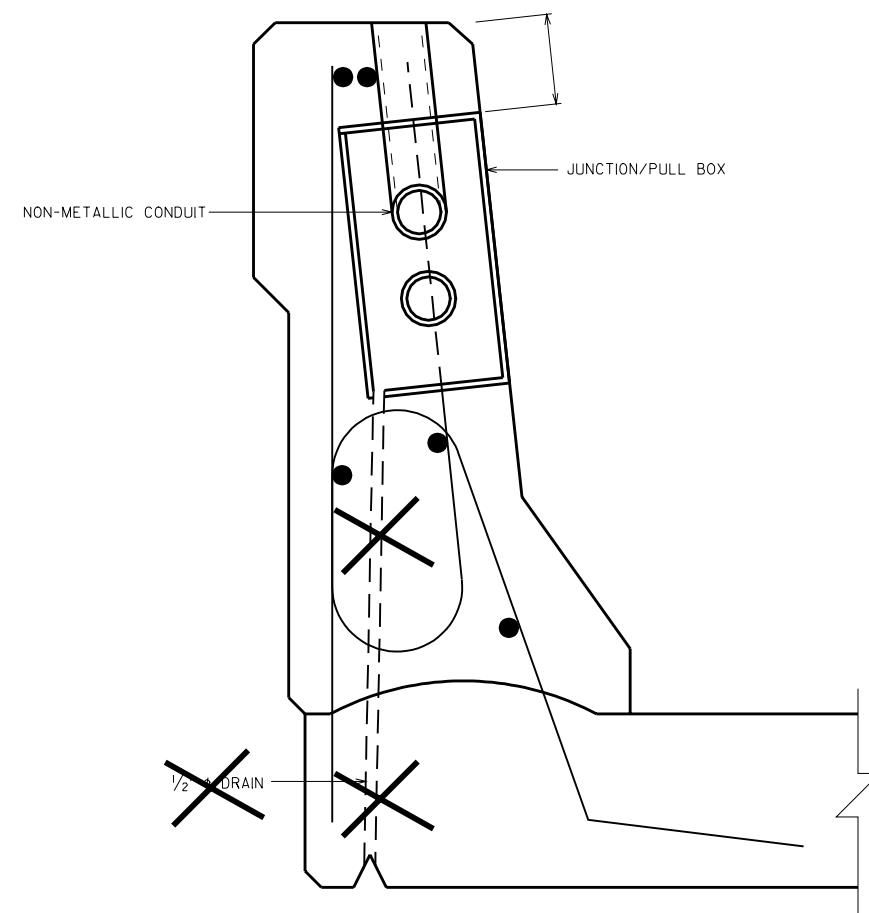
DATE:

1-03



INSIDE ELEVATION

~~X~~ REMOVE DRAIN PER STAN 1/8/03



SECTION A-A

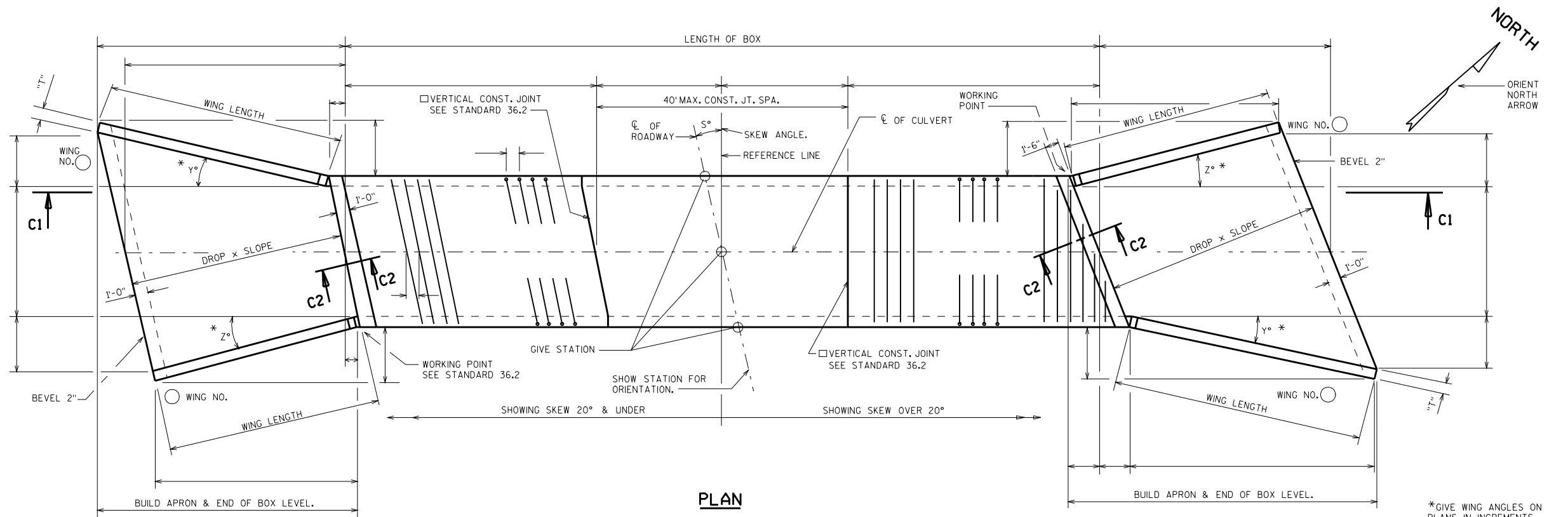
NOTES

BID ITEM SHALL BE "JUNCTION BOXES __ X __ X __, INCH", EACH.

MINIMUM JUNCTION BOX = 16" X 12" X 6" (1- 2" ϕ CONDUIT)
 MAXIMUM JUNCTION BOX = 18" X 12" X 6" (2 - 2" ϕ CONDUITS) (SHOWN)
 PULL BOX = 18" X 6" X 6" (1- 1" ϕ CONDUIT OR 2 - 2" ϕ CONDUITS)

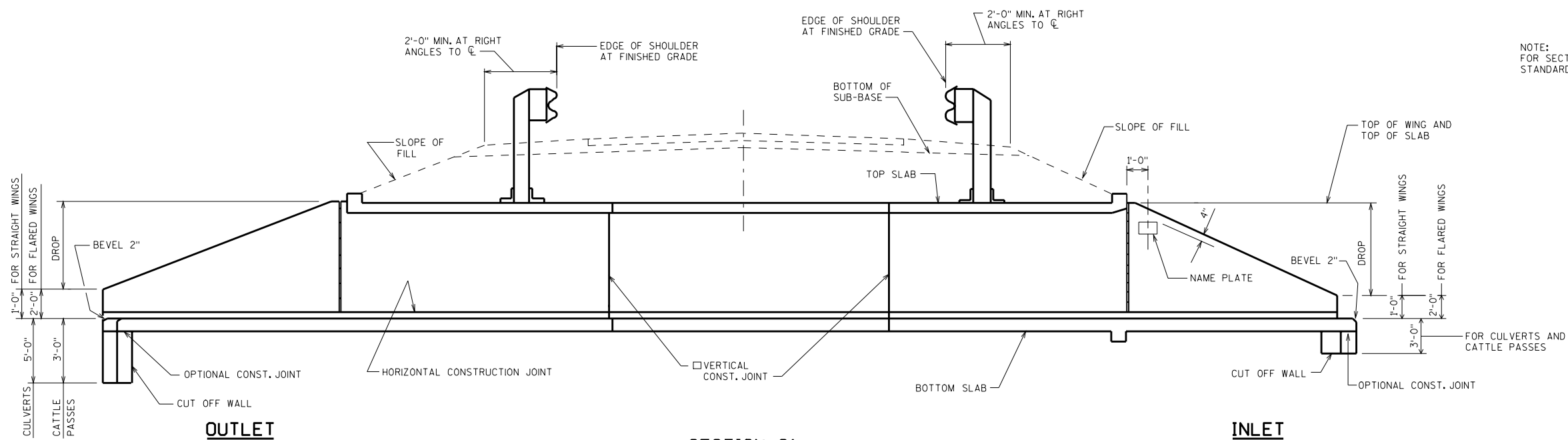
JUNCTION BOX FOR SLOPED FACE PARAPET "LF" SHOWN,
 JUNCTION BOX FOR SLOPED FACE PARAPET "HF" SIMILAR

JUNCTION/PULL BOX DETAIL	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/03



*GIVE WING ANGLES ON PLANS IN INCREMENTS OF 5°. SEE BRIDGE MANUAL.

NOTE:
FOR SECTION C2 SEE STANDARD 36.3



DESIGN DATA

LIVE LOAD: HS 20
 **EARTH LOAD: DESIGNED FOR FEET OF FILL
 ALLOWABLE DESIGN STRESSES:
 CONCRETE MASONRY GRADE A-FA $f'_c = 3.5$ K.S.I.
 BAR STEEL REINFORCEMENT $f_y = 60$ K.S.I.

**FIGURE TO BE TO THE NEAREST 0.5 FEET ON FILLS UNDER 4 FEET AND TO THE NEAREST FOOT ON FILLS OVER 4 FEET

BOX CULVERT LAYOUT

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1-02

NOTES

BAR STEEL REINFORCEMENT SHALL BE IMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES" SHALL BE THE EXISTING GROUND LINE.

WHEN STRUCTURE BACKFILL IS REQUIRED: ALL SPACES EXCAVATED AND NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH STRUCTURE BACKFILL TO THE ELEVATION AND SECTION EXISTING PRIOR TO EXCAVATION WITHIN THE LENGTH OF THE BOX.

THE CONCRETE IN THE CUT OFF WALL MAY BE PLACED UNDERWATER IF THE EXCAVATION CANNOT BE DEWATERED.

THE ALTERNATE CUT OFF WALL MAY BE USED IN LIEU OF THE CAST-IN-PLACE CONCRETE CUT OFF WALLS. PAYMENT SHALL BE BASED ON CONCRETE CUT OFF WALLS.

LOCATE NAME PLATE ON NEAREST RIGHT WING TRAVELING UP STATION, FACE NAME PLATE UP STATION.

HARDWARE FOR POST ANCHORS SHALL BE PAID FOR AS "STRUCTURAL CARBON STEEL".

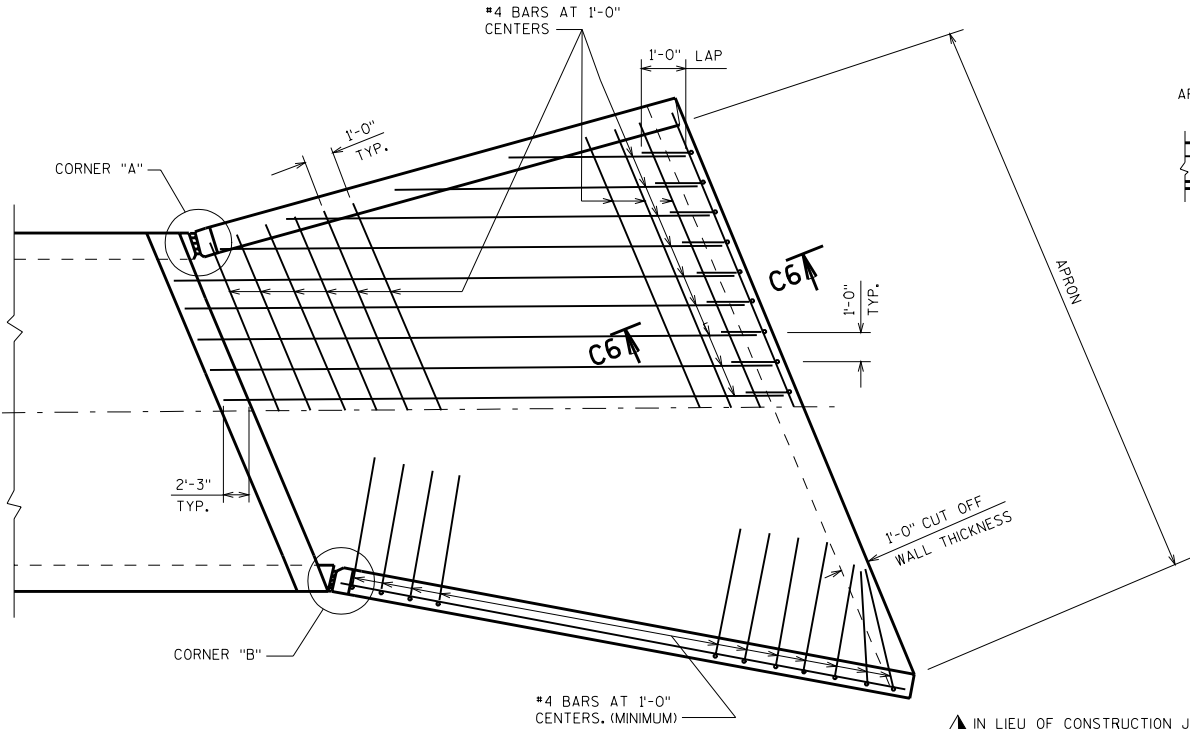
FOR "B" DESIGNATED CONCRETE BOX CULVERTS HAVING THEIR TOP SURFACE AT GRADE, HAND HELD FINISHING MACHINES MAY BE USED. NOTE THIS ON PLANS WHEN APPLICABLE.

THE CONTRACTOR MAY FURNISH A PRECAST CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE BOX CULVERT WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION. THE PRECAST CONCRETE BOX CULVERT SHALL CONFORM TO PRECAST DETAILS IN CHAPTER 36 STANDARDS OF THE CURRENT WISCONSIN DOT BRIDGE MANUAL. PAYMENT FOR THE PRECAST CULVERT SHALL BE BASED ON THE PRICES BID FOR THE ITEMS LISTED IN THE "TOTAL ESTIMATED QUANTITIES".

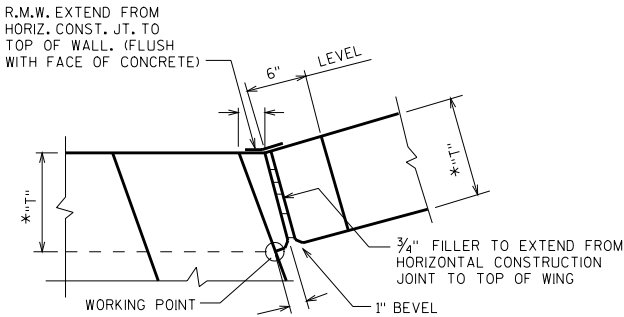
MAX. VALUE FOR "WH" = 13'-0"

"H" (FT.)	"L" (FT.)
≤ 5'-0"	2'-3"
> 5'-0" - 7'-0"	3'-3"
> 7'-0" - 8'-0"	4'-0"
> 8'-0" - 9'-0"	4'-9"
> 9'-0" - 10'-0"	5'-9"
> 10'-0" - 11'-0"	6'-6"
> 11'-0" - 12'-0"	7'-6"
> 12'-0" - 13'-0"	8'-0"
> 13'-0" - 14'-0"	8'-6"

"H" IS MAX. WING WALL HEIGHT

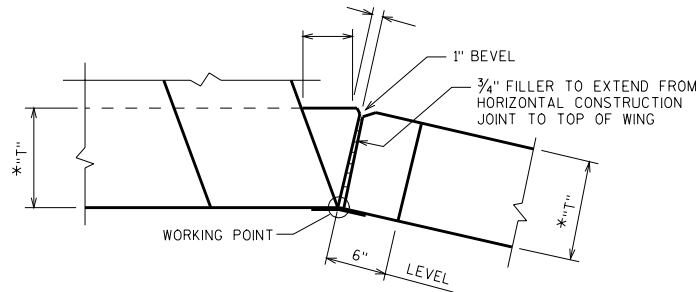


APRON DETAIL

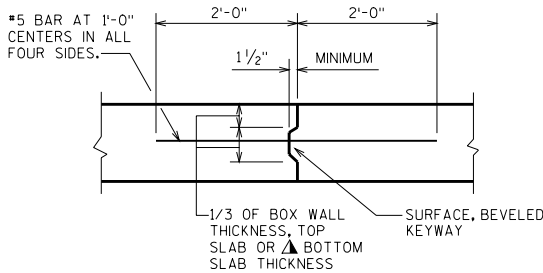


CORNER "A"

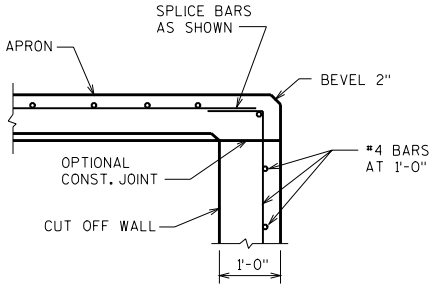
* DIMENSION "T" TO BE DETERMINED FROM BARREL DESIGN



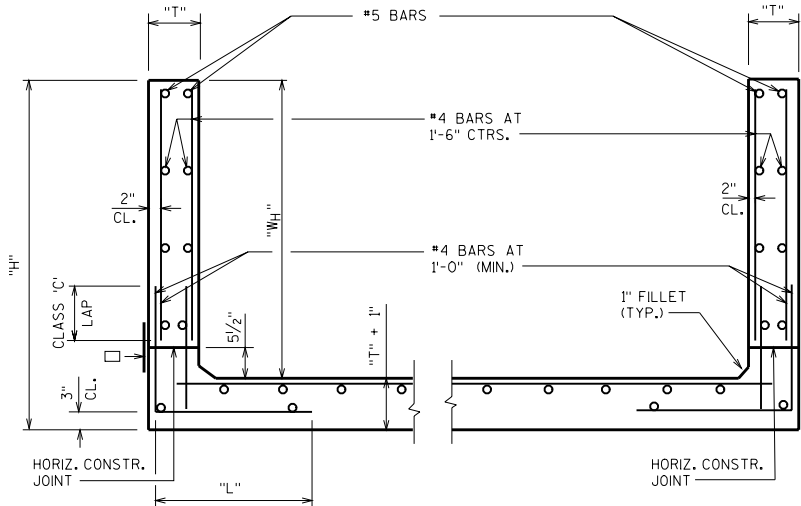
CORNER "B"



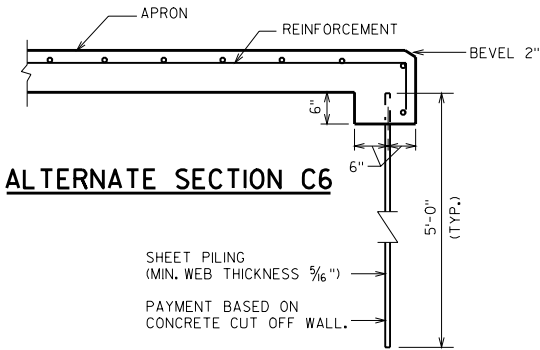
VERTICAL CONSTRUCTION JOINT



SECTION C6

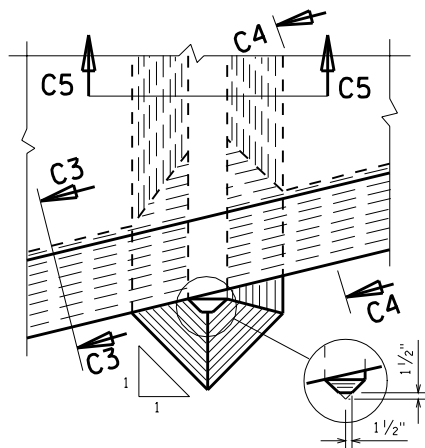


SECTION THRU WINGWALLS

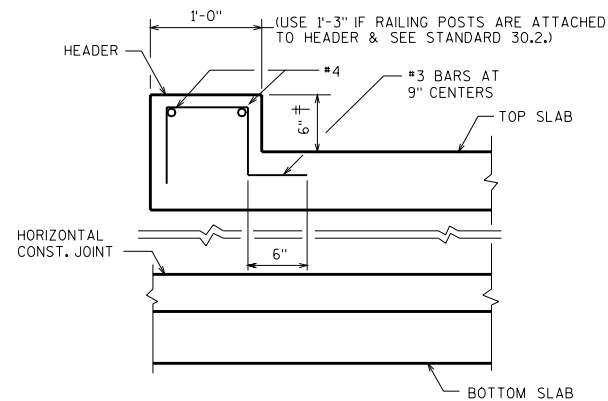


ALTERNATE CUTOFF WALL

BOX CULVERT APRON DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 6-02

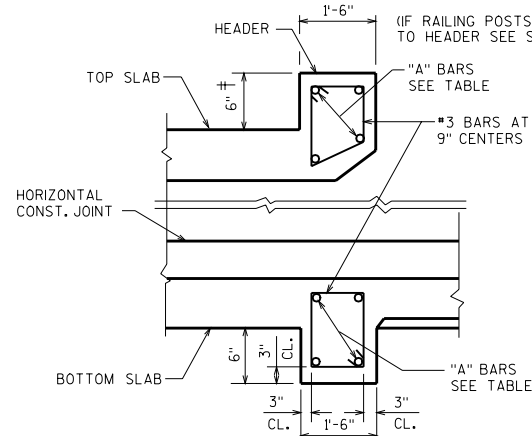


PLAN



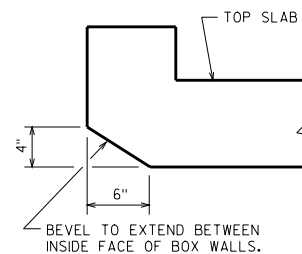
SECTION C2 FOR SKEW OF 20° AND UNDER

OUTLET HEADERS SHOWN



SECTION C2 FOR SKEW OVER 20°

† IF RAILING POSTS ARE ATTACHED TO HEADER THIS DIMENSION MAY BE INCREASED IF NECESSARY TO KEEP RAILING PARALLEL TO ROADWAY. INCREASE WING HEIGHT IF NECESSARY.

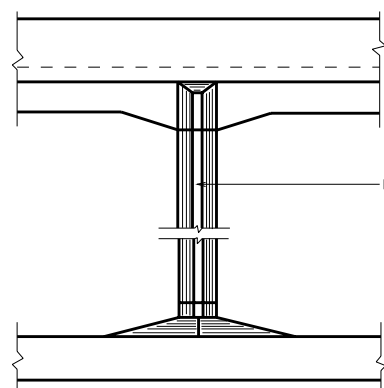


SECTION C3

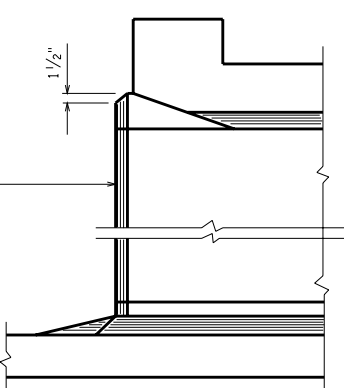
TYPICAL ALL INLETS

* HEADER LENGTH	"A" BARS
TO 10'-0"	4 - #7
OVER 10'-0" - 13'-0"	4 - #8
OVER 13'-0" - 16'-0"	4 - #9
OVER 16'-0" - 20'-0"	4 - #10

* HEADER LENGTH EQUALS THE DISTANCE BETWEEN CL. OF WALLS IN ONE CELL MEASURED ALONG THE SKEW.

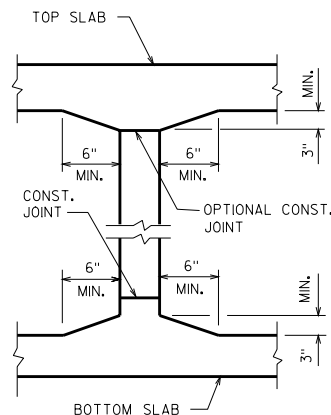


ELEVATION



SECTION C4

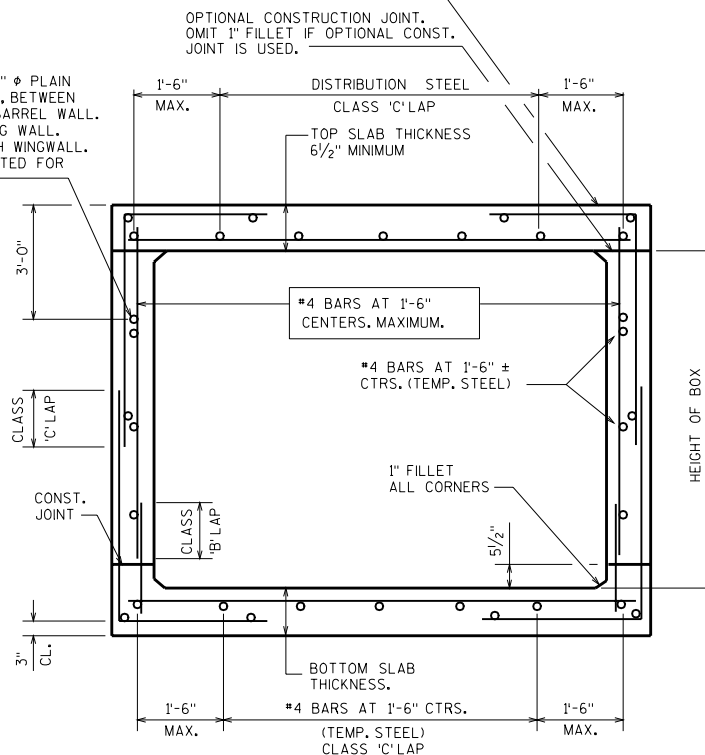
INLET NOSE CENTERWALL DETAILS



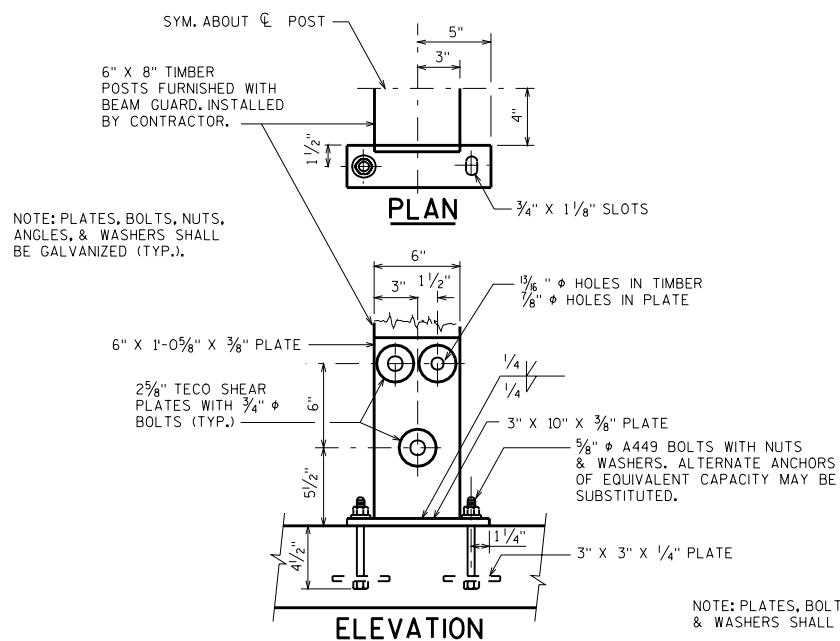
SECTION C5

NOTE: FOR MULTI-CELL CULVERTS IN THE TOP OF TOP SLAB, USE #4 BARS AT 1'-0" IN THE LONGITUDINAL DIRECTION AND A MIN. OF #4 BARS AT 1'-6" IN THE TRANSVERSE DIRECTION WHEN THE TOP SLAB IS AN INTEGRAL PART OF WEARING SURFACE.

FOR "HEIGHT OF BOX" > 6'-0", PLACE 1" ϕ PLAIN (SMOOTH) ROUND DOWEL BAR, 2'-6" LONG, BETWEEN BARREL AND WINGS. EMBED 1'-3" INTO BARREL WALL. USE DEBONDER ON EXTENSION INTO WING WALL. BEND AS REQUIRED. ONE BAR FOR EACH WINGWALL. ASTM A36 MATERIAL MAY BE SUBSTITUTED FOR AASHTO M31.

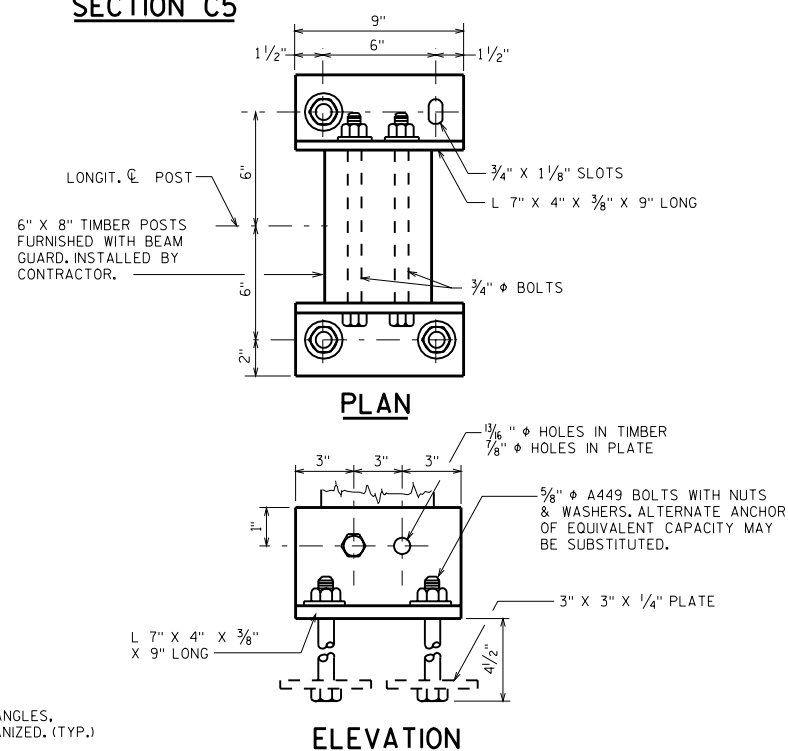


SECTION THRU BOX



TIMBER GUARD RAIL POST ANCHORS TYPE 1

USE FOR POSTS EMBEDDED 2'-0" OR LESS.



TIMBER GUARD RAIL POST ANCHORS, TYPE 2

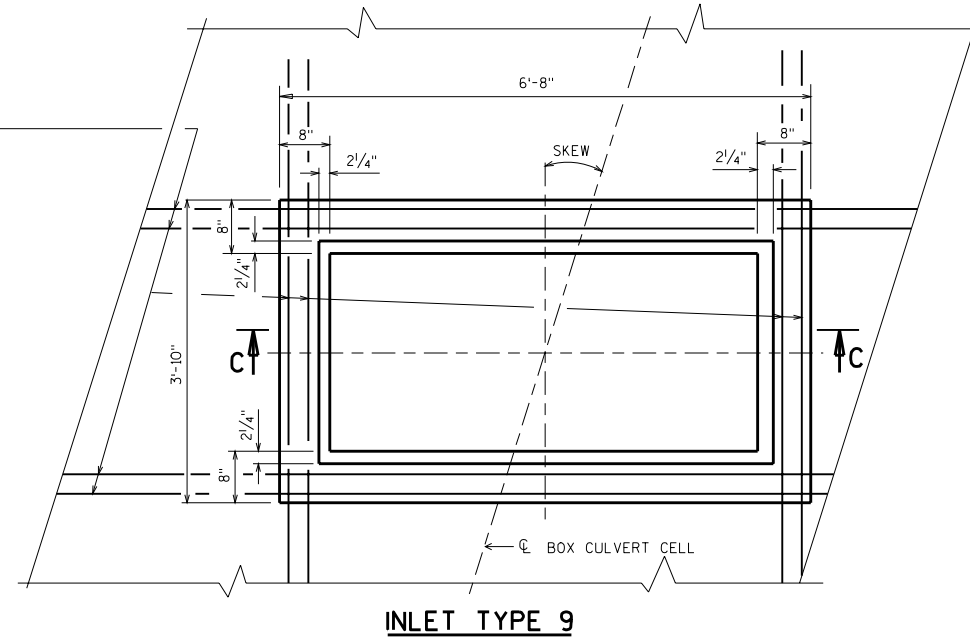
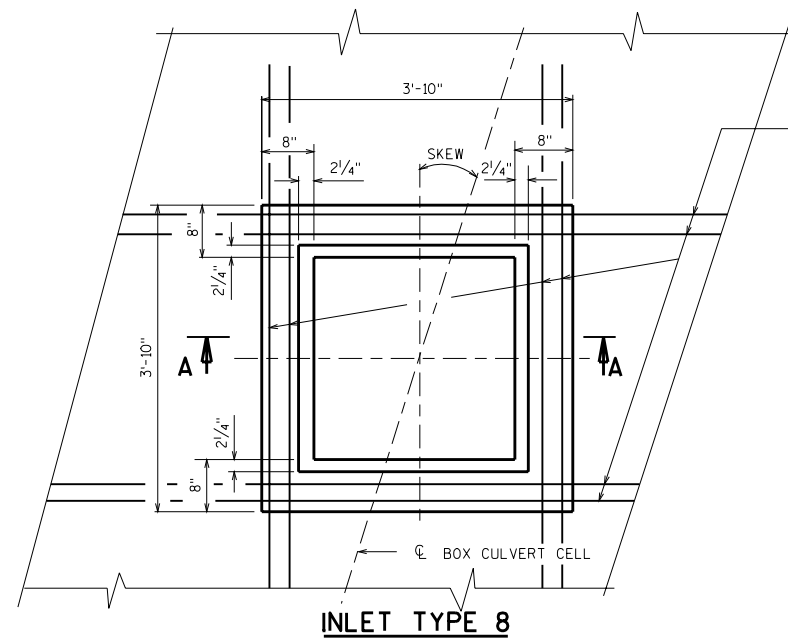
USE FOR POSTS EMBEDDED OVER 2'-0" BUT LESS THAN 4'-0" ANCHORS NOT REQ'D FOR POSTS EMBEDDED 4'-0" OR MORE

BOX CULVERT DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
7/00



MEDIAN INLET PLAN

(INLET COVER NOT SHOWN)

GENERAL NOTES

FIELD CUT BAR STEEL REINFORCEMENT IN TOP SLAB
TO CLEAR THE OPENING PROVIDED FOR MEDIAN INLET.

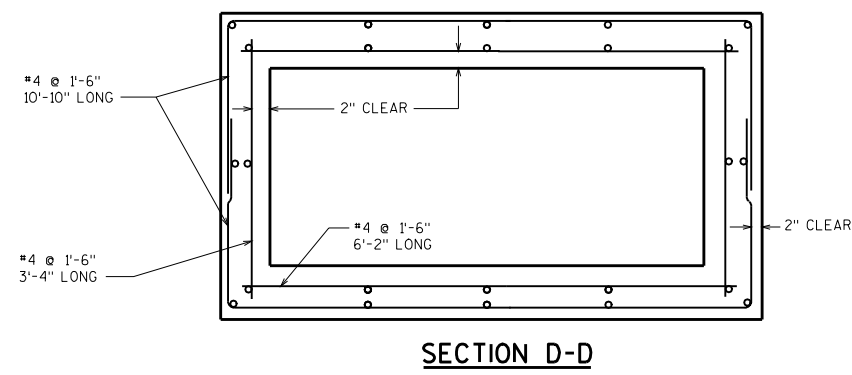
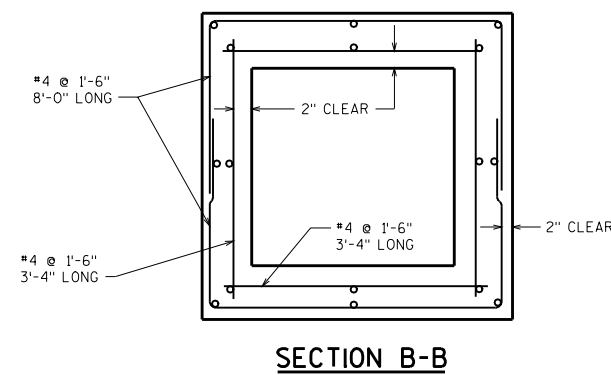
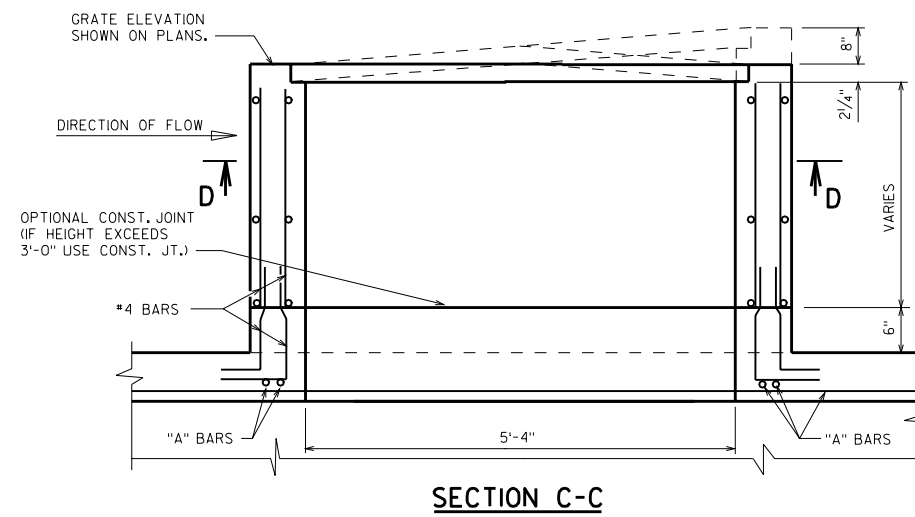
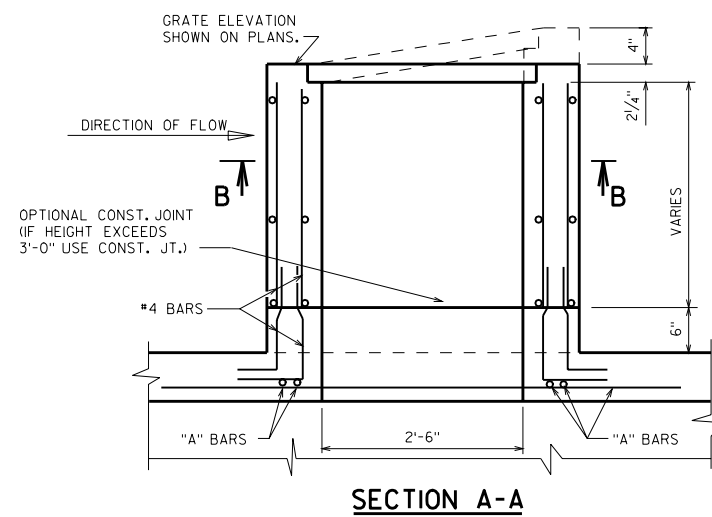
ADJUSTMENT OF THE COVER TO GRADE MAY BE ACCOMPLISHED BY THE USE OF MORTAR AND BRICK. MAXIMUM ADJUSTMENT SHALL BE 8".

DESIGN NOTES

SIZE AND LENGTH OF "A" BARS TO BE DETERMINED BY THE DESIGNER.

STEEL SHOWN IS ADEQUATE TO DEPTHS UP TO 15'-6" FOR INLET TYPE 9 AND 44'-0" FOR INLET TYPE 8, ASSUMING EQUIVALENT FLUID PRESSURE OF 33#/SQ.FT.,.

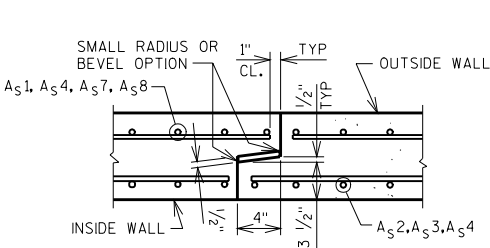
VERTICAL STEEL ADEQUATE FOR DEPTH UP TO
25'-0" ASSUMING WIND LOAD OF 50#/SQ. FT..



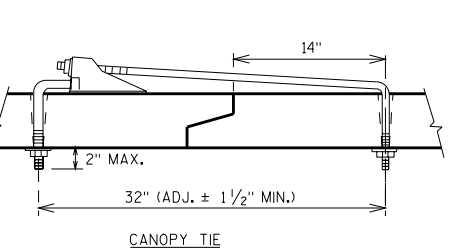
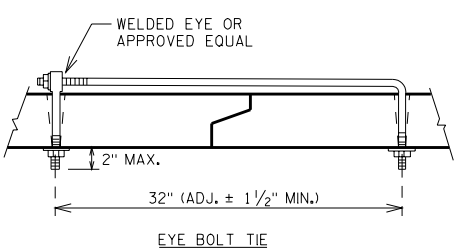
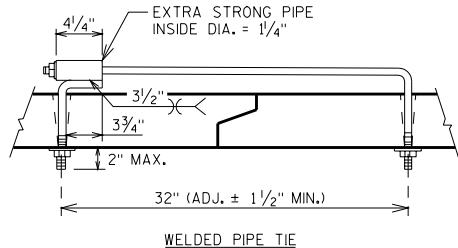
BOX CULVERT MANHOLE
FOR INLET TYPE 8 & 9

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____	DATE: 1/99
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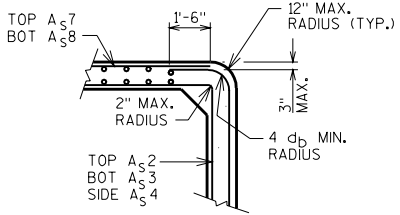


TONGUE AND GROOVE JOINT DETAIL

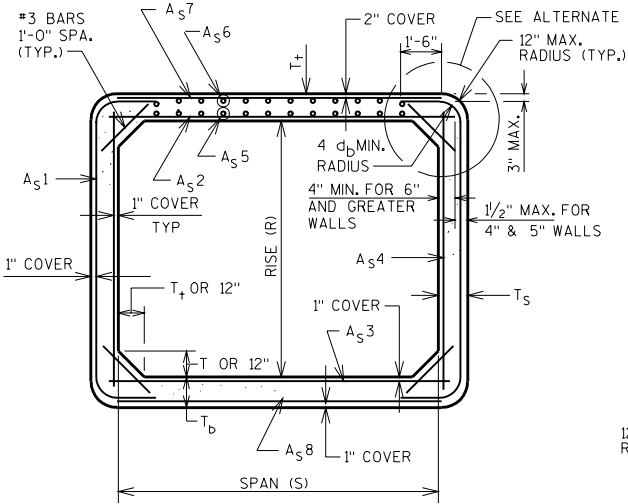


JOINT TIES

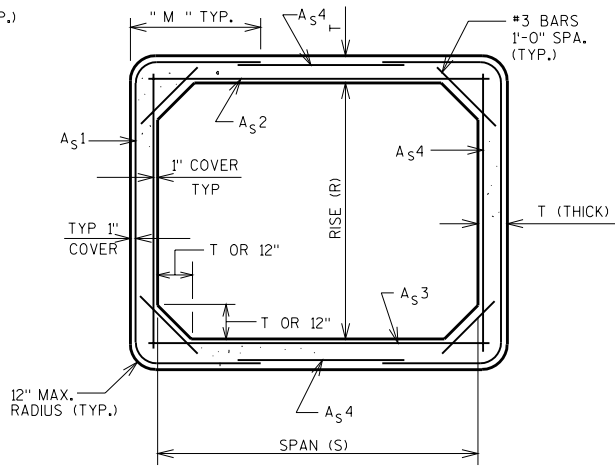
NOTES:
EITHER EYE BOLT TIES, WELDED PIPE TIES, OR CANOPY TIES MAY BE USED.
THREADS MAY BE CUT OR ROLLED. TIE NUTS SHALL BE TIGHTENED AS DIRECTED
BY THE ENGINEER. (2 TIES REQ'D. PER JOINT.) (TIES TO BE GALVANIZED.)



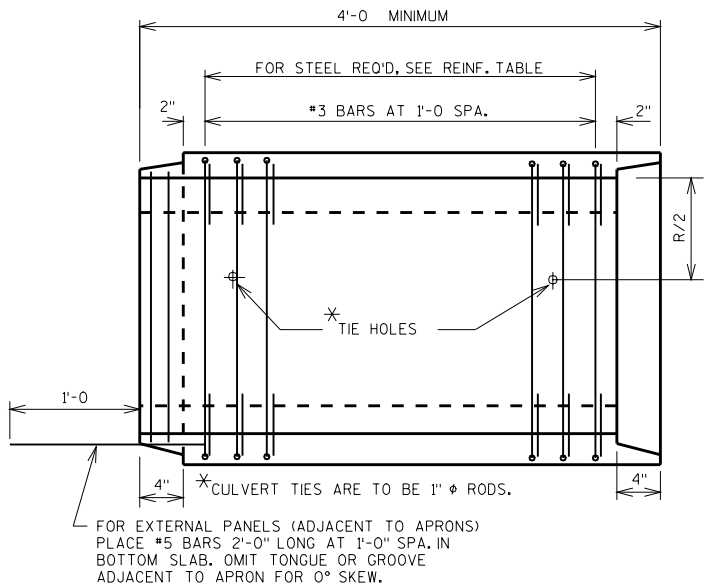
ALTERNATE DETAIL OPTION



SECTION THRU BARREL
FOR LESS THAN 2 FEET OF COVER



SECTION THRU BARREL
FOR 2'-0" OR MORE OF COVER



LONGITUDINAL SECTION

NOTES

DETAILS FOR MATERIALS, FABRICATION, CONSTRUCTION AND DESIGN OF PRECAST BOX CULVERTS NOT SHOWN OR STATED ON THIS DRAWING SHALL BE IN ACCORDANCE WITH THE CURRENT AASHTO STANDARD SPECIFICATIONS FOR TRANSPORTATION MATERIALS, M259 OR M273; AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, DIVISION 2, SECTION 27; WISCONSIN DOT STANDARD SPECIFICATIONS & APPLICABLE SPECIAL PROVISIONS, EXCEPT THAT THE CONCRETE MIXTURE SHALL CONTAIN NOT LESS THAN 565 LBS. OF CEMENTITIOUS MATERIALS PER CUBIC YARD.

THE DESIGN OF PRECAST BOX CULVERTS WITH 2'-0" OR MORE OF COVER SHALL BE AS STATED IN THE AASHTO MATERIAL SPECIFICATIONS M259, TABLE 1, 2, OR 3 EXCEPT THAT THE DESIGN SHALL BE BASED ON AN ADJUSTED "EARTH COVER" EQUAL TO THE ACTUAL "EARTH COVER" MULTIPLIED BY 1.3 AND ROUNDED UP OR DOWN TO THE NEAREST ROW IN THE TABLE.

THE DESIGN OF PRECAST BOX CULVERTS WITH LESS THAN 2 FEET OF FILL SHALL BE AS STATED IN ASTM C1433.

ALL PRECAST BOX SECTIONS SHALL BE PLACED ON A BEDDING OF "STRUCTURE BACKFILL" OF 6" MINIMUM DEPTH.

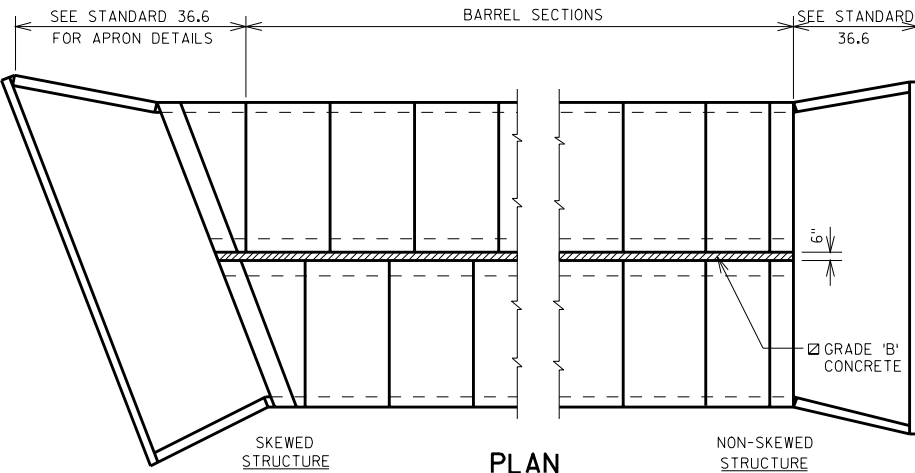
THE COVER OF CONCRETE OVER THE REINFORCEMENT SHALL BE 1 INCH OR 2 INCHES IF SHOWN WITH AN ALLOWABLE VARIATION OF -3/8" TO +1/2 INCH.

THE SPACING CTR. TO CTR. OF THE CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 4 INCHES. THE SPACING CTR. TO CTR. OF THE LONGIT. WIRES SHALL NOT BE MORE THAN 8 INCHES.

NOT MORE THAN FOUR (4) HOLES MAY BE CAST, DRILLED OR OTHERWISE NEATLY MADE IN THE SHELL OF EACH PIECE OF BOX SECTION FOR HANDLING. THE HOLES SHALL BE TAPERED UNLESS DRILLED. HOLES SHALL BE FILLED WITH PORTLAND CEMENT MORTAR EXCEPT TAPERED HOLES MAY BE FILLED WITH CONCRETE PLUGS SECURED WITH PORTLAND CEMENT MORTAR OR OTHER APPROVED ADHESIVE.

THE JOINT ON THE BOTTOM OF THE CULVERT & THE SIDES OF THE CULVERT FROM THE BOTTOM TO A POINT 1'-0" FROM THE CEILING SHALL BE SEALED WITH A PREFORMED MASTIC. PREFORMED MASTIC MUST CONFORM TO AASHTO MATERIALS SPEC. M198, TYPE B. A 2'-0" STRIP OF GEOTEXTILE FABRIC SHALL BE PLACED OVER THE JOINTS ON THE TOP AND ON THE SIDES OF THE CULVERT. THE GEOTEXTILE FABRIC SHALL COMPLY WITH REQUIREMENTS OF STANDARD SPECIFICATION 645.2.4, SCHEDULE A. (FABRIC NOT REQUIRED OVER INSIDE WALL JOINTS OF MULTICELL INSTALLATION.)

WHEN TWO OR MORE BARRELS ARE UTILIZED IN PARALLEL FOR MULTICELL INSTALLATIONS THE CLEAR SPACING BETWEEN BARRELS SHALL BE 6 INCHES AND THE SPACE BETWEEN ADJACENT BARRELS FROM TOP OF BEDDING TO TOP OF TOP SLAB SHALL BE FILLED WITH GRADE "B" CONCRETE.



PLAN
MULTICELL INSTALLATION

BOX CULVERT DATA

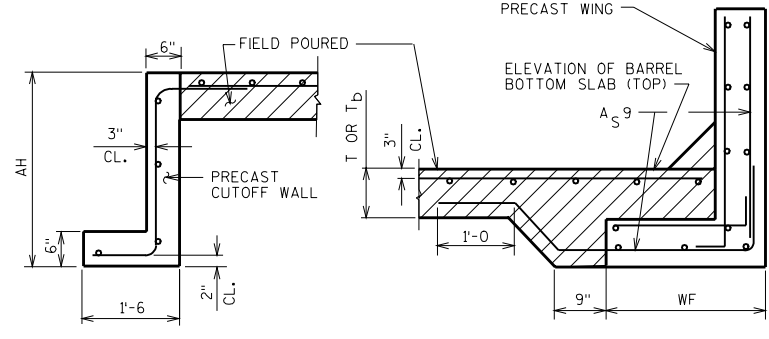
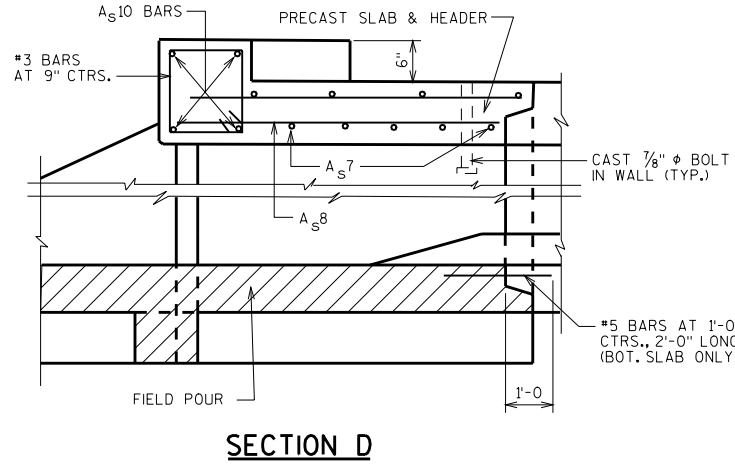
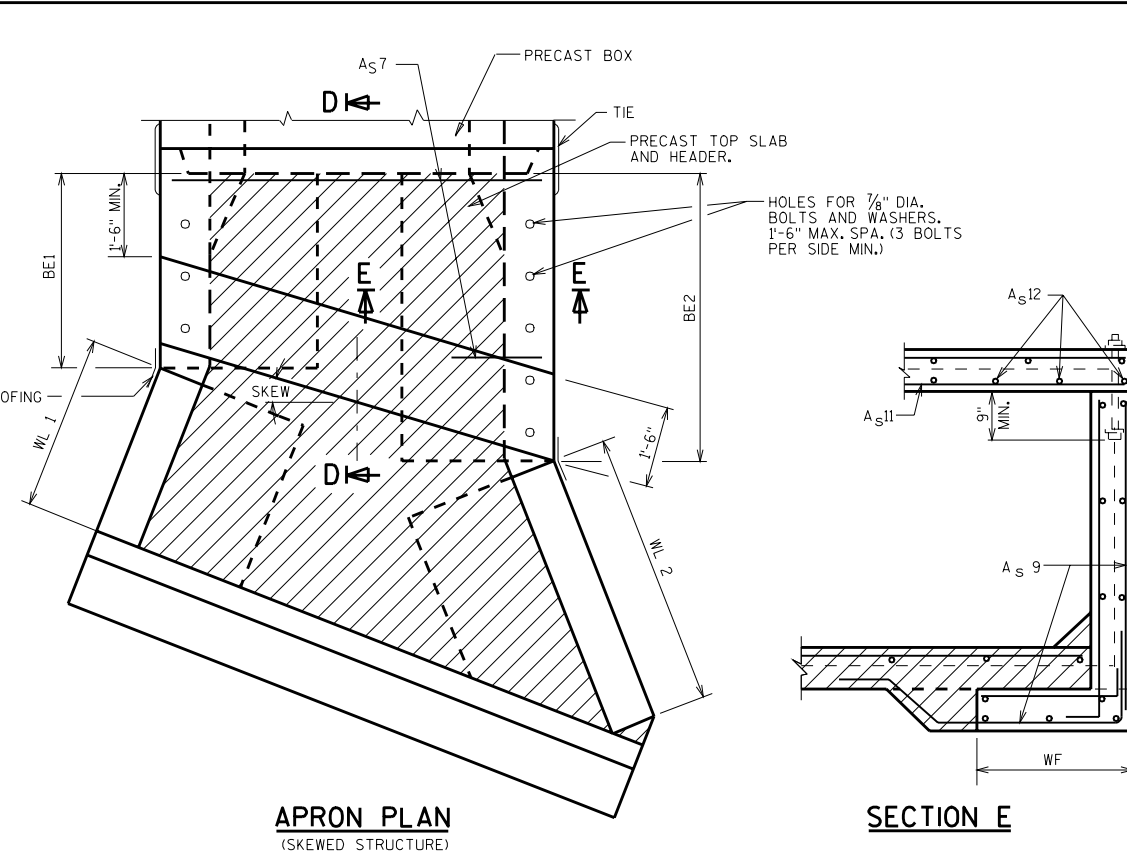
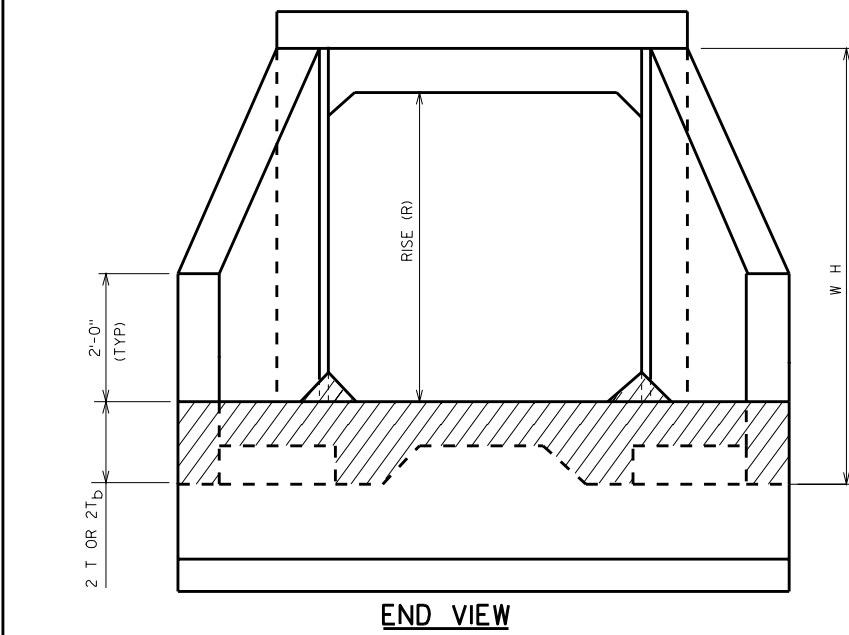
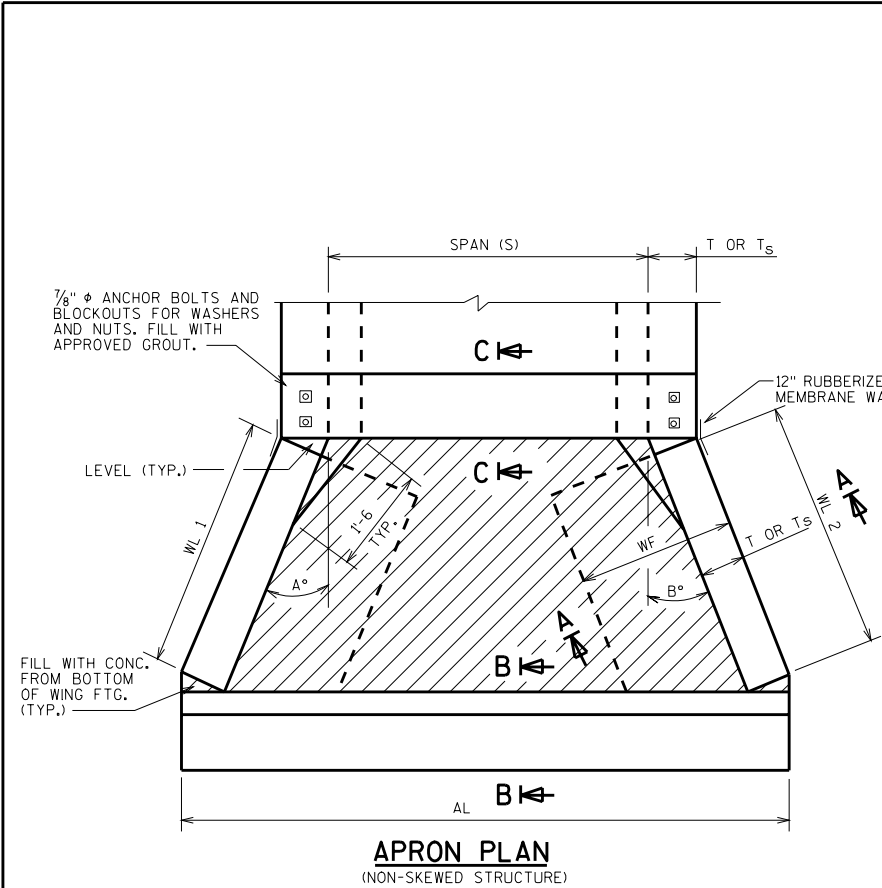
BOX CULVERT DATA

DIMENSIONS			EARTH COVER (FT.)								
S (FT.)	R(FT.)	T OR T _S , T _D , T _T (IN.)									
REINFORCEMENT			AREA/FT.	LENGTH	M	AREA/FT.	LENGTH	M	AREA/FT.	LENGTH	M
A _S 1											
A _S 2											
A _S 3											
A _S 4											
A _S 5											
A _S 6											
A _S 7											
A _S 8											
TOTAL BARREL OR PANEL LENGTH											

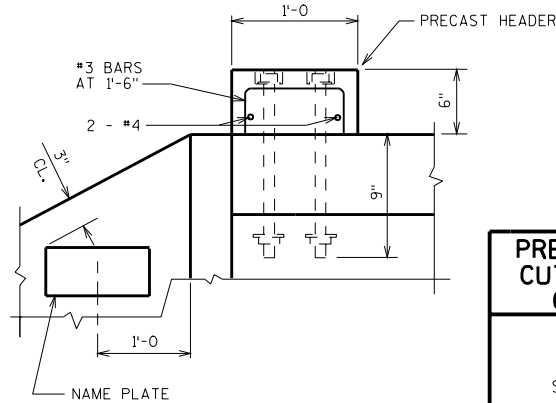
PRECAST CONCRETE BOX
CULVERT BARREL DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 6/02



SECTION A



GENERAL NOTES

CONCRETE COVER ON ALL REINFORCEMENT IN THE PRECAST ELEMENTS SHALL BE 2" UNLESS SHOWN OR NOTED OTHERWISE.

STEEL REINFORCEMENT MAY BE EITHER GRADE 60 DEFORMED BARS (FY = 60,000 P.S.I.) OR WELDED DEFORMED - WIRE FABRIC OF EQUIVALENT AREA, (FY = 65,000 P.S.I.)

THE ULTIMATE COMPRESSIVE STRENGTH OF THE FIELD POURED CONCRETE SHALL BE 3,500 P.S.I.

ALTERNATE DETAILS OF EQUAL STRENGTH AND HYDRAULIC CAPACITY TO THE DETAILS SHOWN ON THIS SHEET MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

THE ULTIMATE COMPRESSIVE STRENGTH OF THE CONCRETE IN THE PRECAST ELEMENTS SHALL BE 4,000 P.S.I.

THE PRECAST ELEMENTS SHALL BE PROVIDED WITH SUITABLE LIFTING DEVICES FOR HANDLING AND PLACEMENT OF THE ELEMENTS.

VERTICAL CONSTRUCTION JOINTS THRU THE WALLS AND FOOTING WILL BE ALLOWED ONLY WITH THE APPROVAL OF THE ENGINEER. DETAILS MUST BE SHOWN ON THE SHOP DRAWINGS FOR APPROVAL.

THE AREA OF REINFORCING STEEL NOT IDENTIFIED IN SECTIONS EQUALS 0.17 IN²/FT.

THE MAXIMUM BAR SIZE OF GRADE 60 DEFORMED BARS, OTHER THAN THE A_s10 BARS, SHALL BE #5.

THE 7/8" ϕ ANCHOR BOLTS SHALL BE GALVANIZED AND CONFORM TO THE REQUIREMENTS OF A.S.T.M. A575.

ALL EXPOSED CORNERS SHALL BE BEVELED 3/4" ON THE SIDES OR TOOL EDGED WITH A 1/2" MINIMUM RADIUS EDGER.

PRECAST CUT OFF WALLS MAY BE FIELD SPLICED BY EXTENDING THE REINFORCING STEEL FROM BOTH SEGMENTS TO BE SPLICED 1'-6" INTO THE SPLICE ZONE, LAPPING THE STEEL \pm 1'-6" AND FIELD POURING A SECTION OF CUT OFF WALL 1'-6" LONG.

PRECAST ELEMENTS MAY BE POURED IN PLACE AT THE OPTION OF THE CONTRACTOR.

	S(FT.)	R.(FT.)	T OR T _s (IN)	SKEW	ANGLE A	ANGLE B	WL 1	WL 2	AL	AH	WH	BE1	BE2
INLET													
OUTLET													

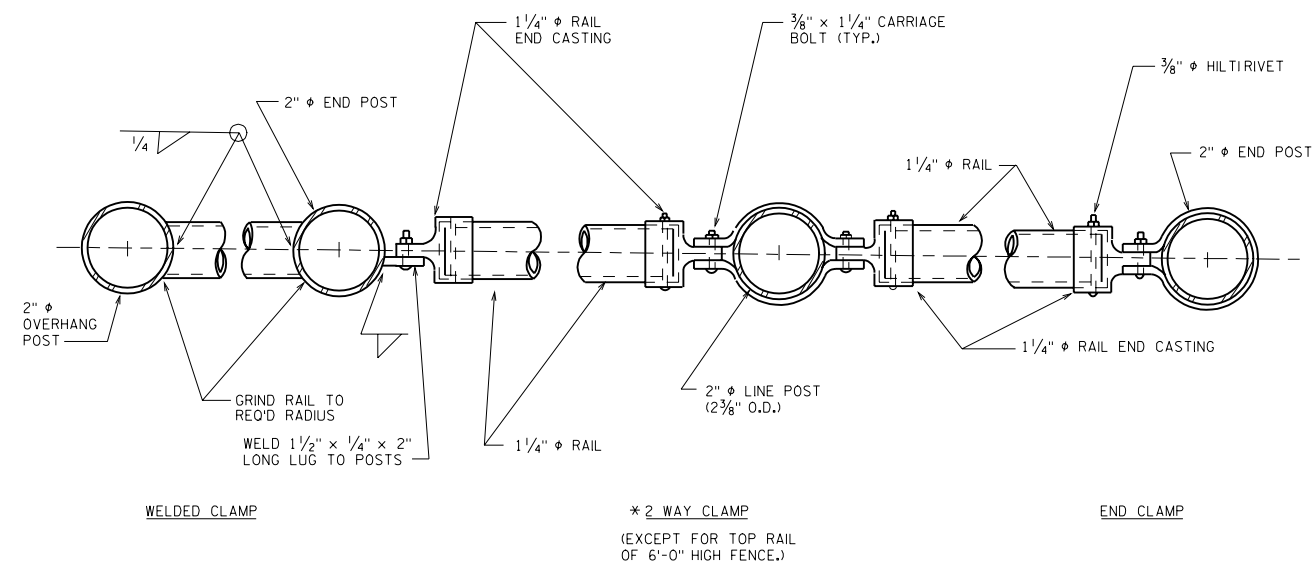
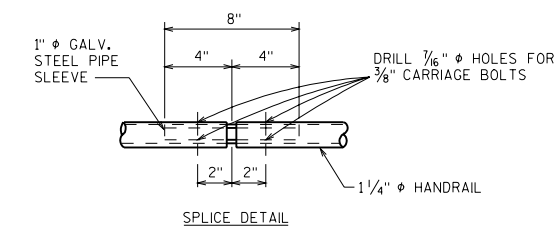
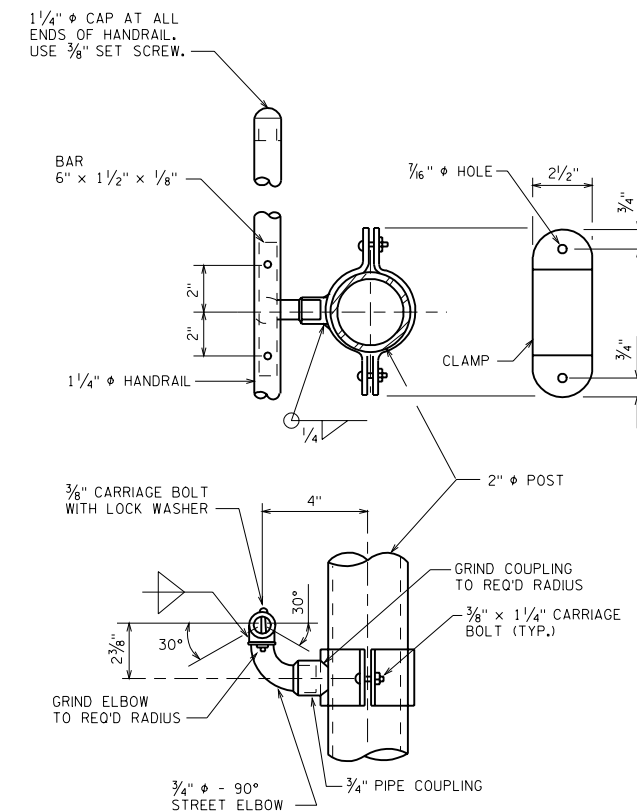
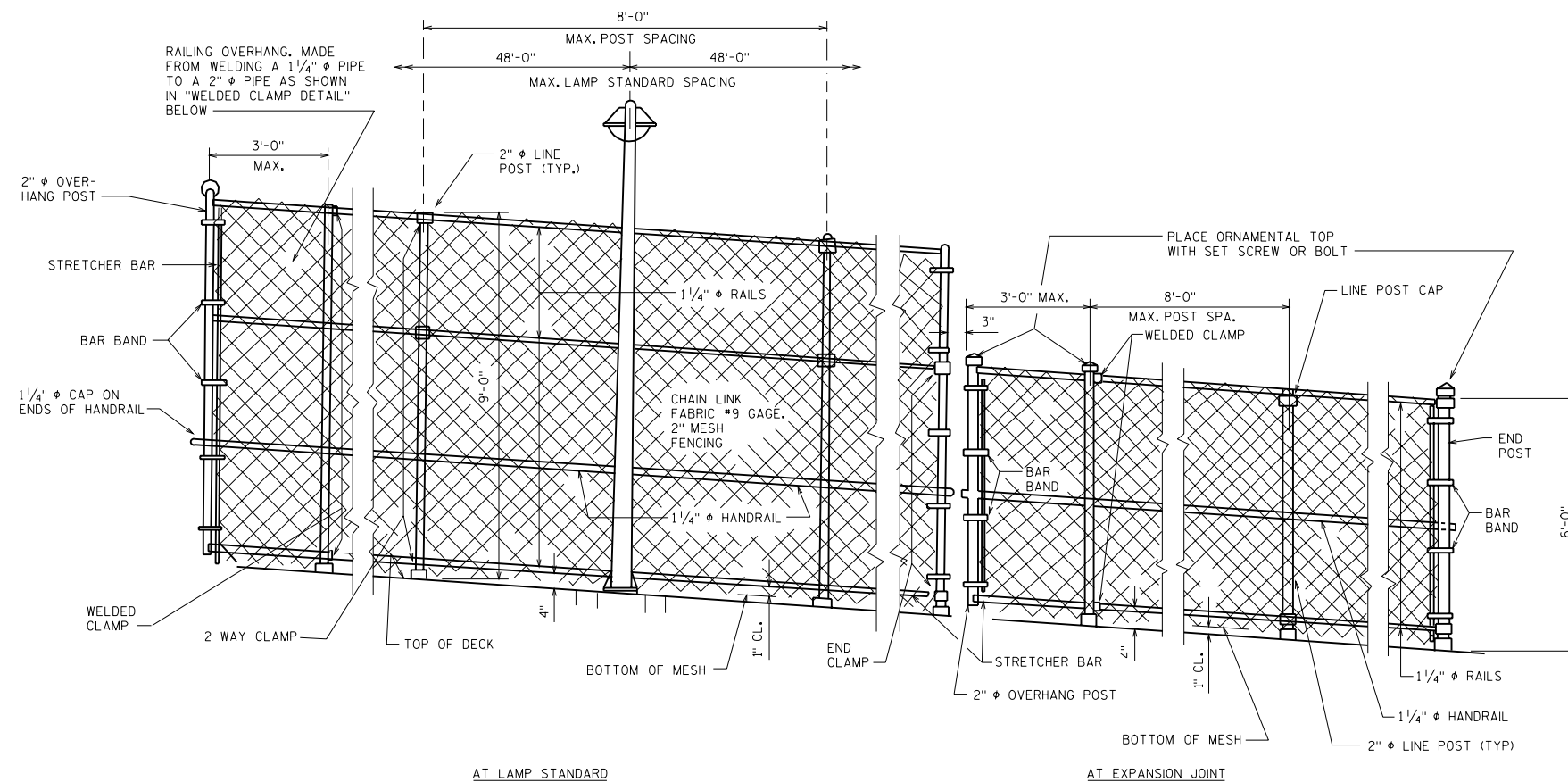
SPAN (S)	A S 10 BARS			A S 11 IN. ² /FT.	A S 12 IN. ² /FT.		
	SKEW				SKEW		
	0°-15°	16°-30°	31°-45°		0°-15°	16°-30°	31°-45°
6'-0"	4 #6	4 #6	4 #7	.35	.17	.17	.17
7'-0"	4 #6	4 #7	4 #7	.35	.17	.17	.19
8'-0"	4 #6	4 #7	4 #8	.42	.17	.19	.24
10'-0"	4 #7	4 #8	4 #8	.48	.19	.24	.24

RISE(R)	A _s 9 IN. ² /FT	WF
4'-0	.19	2'-6
6'-0	.24	3'-6
8'-0	.31	4'-0
10'-0	.34	4'-9

PRECAST WINGS, HEADERS AND CUTOFF WALLS FOR PRECAST CONCRETE BOX CULVERT

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

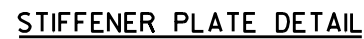
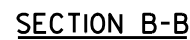
APPROVED: _____ DATE: 3/99



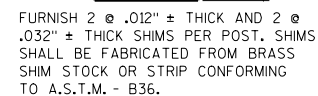
NOTE: PLACE ALL NUTS ON
OUTSIDE OF FENCE.

* ALTERNATE BOULEVARD 2-WAY CLAMP
MAY BE USED WHEN THE POST IS EITHER
BOLTED TO THE 3/2"φ PIPE SLEEVE OR
DIRECTLY WELDED TO THE BASE PLATE.

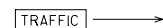
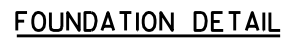
<h1 style="text-align: center;">PEDESTRIAN OVERPASS DETAILS</h1>	
<p style="text-align: center;">STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION</p>	
<p>APPROVED: _____</p>	<p>DATE: _____ 1/03</p>



(SEE TABLE FOR DIMENSIONS)



SHIM DETAIL



POST ON THE RIGHT

POST ON THE LEFT

POST SLOT ORIENTATION



	TYPE	#3-VERTICAL	#4-HOOPS
REINF.	A	8 @ 4'-5"	5 @ 6'-3"
	B	8 @ 6'-5"	7 @ 6'-3"
	C	8 @ 6'-11"	7 @ 6'-3"
	D	8 @ 7'-5"	8 @ 6'-3"
	E	8 @ 7'-11"	9 @ 6'-3"

STRUCTURAL CARBON STEEL PAY WTS. (1POST) = K + (POST LENGTH X POST WT.)
 "K" INCLUDES STUB, BASE PLATES, STIFFS., BOLTS, AND WASHERS.

NOTE:
TIGHTEN THE HIGH STRENGTH BOLTS TO THE TORQUE SHOWN.
DO NOT OVER TIGHTEN.

STANDARD	39.1
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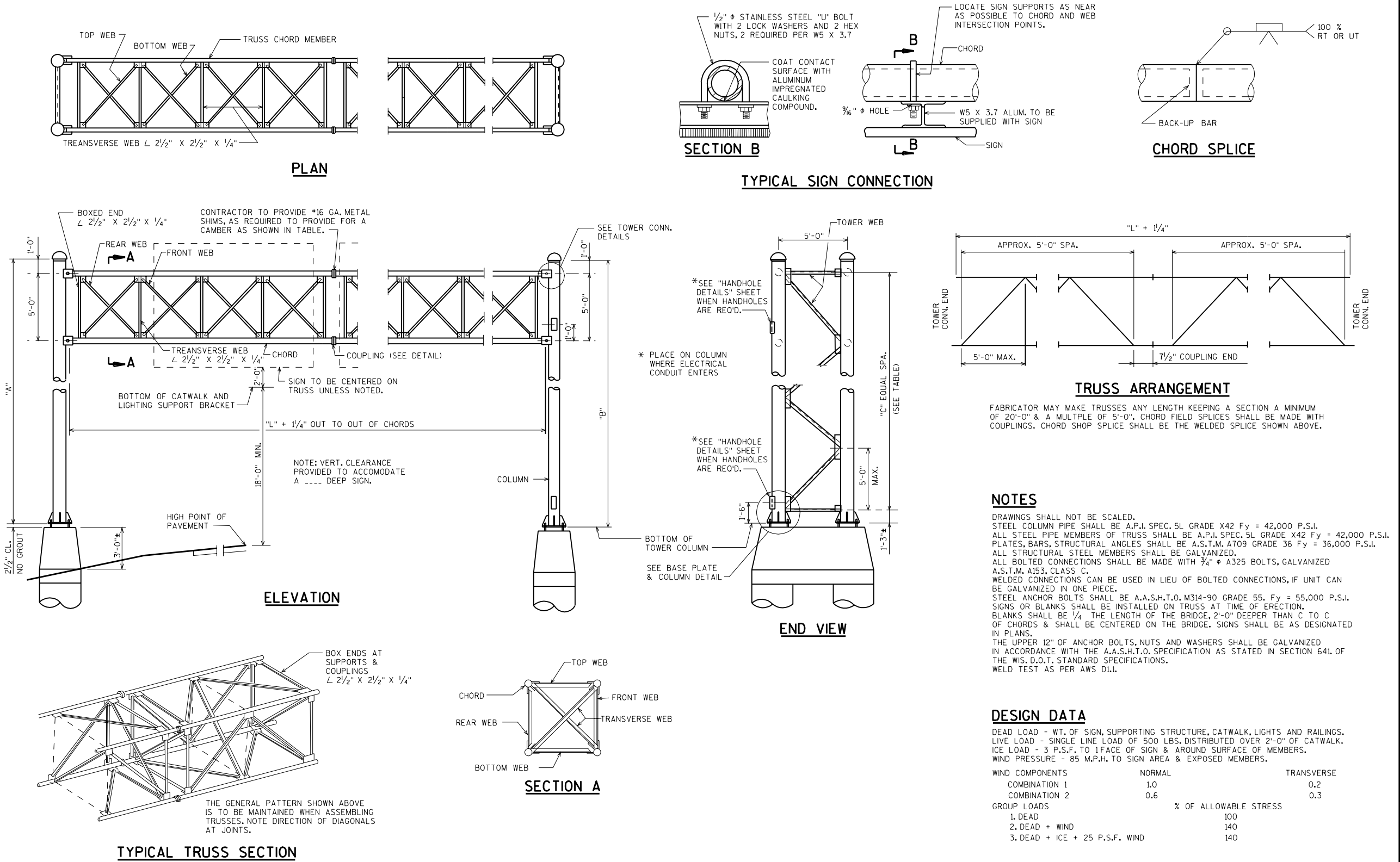


TABLE													
STRUCTURE	A	B	C	CHORDS O.D. X THK.	TOP & BOTTOM WEB	FRONT & REAR WEB	COUPLING PLATE "D1" & "D2"	BOLT CIRCLE DIA. "D2"	NO. OF BOLTS IN COUPLING	CAMBER	COLUMN O.D. X THK.	TOWER WEBS	"L"

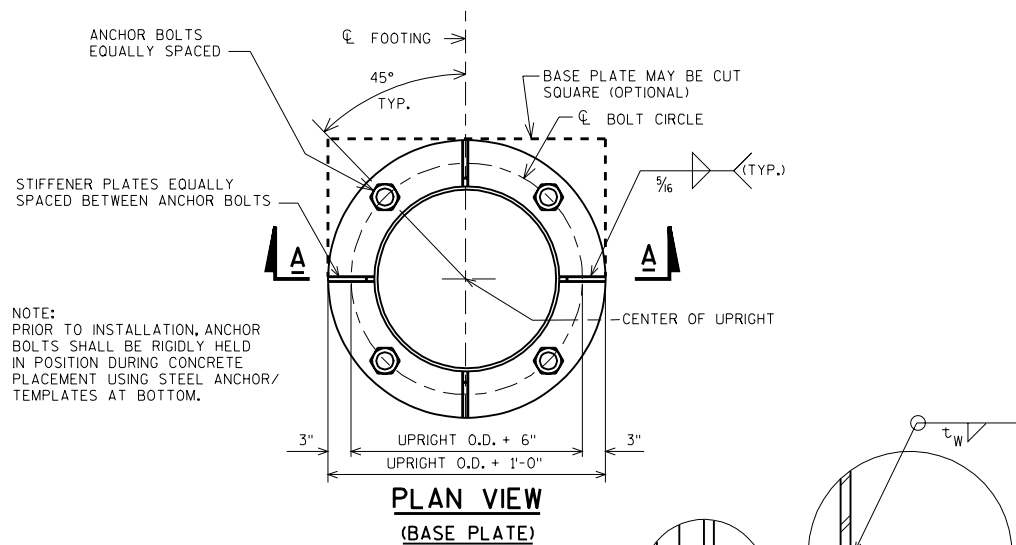
TO BE DESIGNED

4-CHORD GALVANIZED STEEL
SIGN BRIDGE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

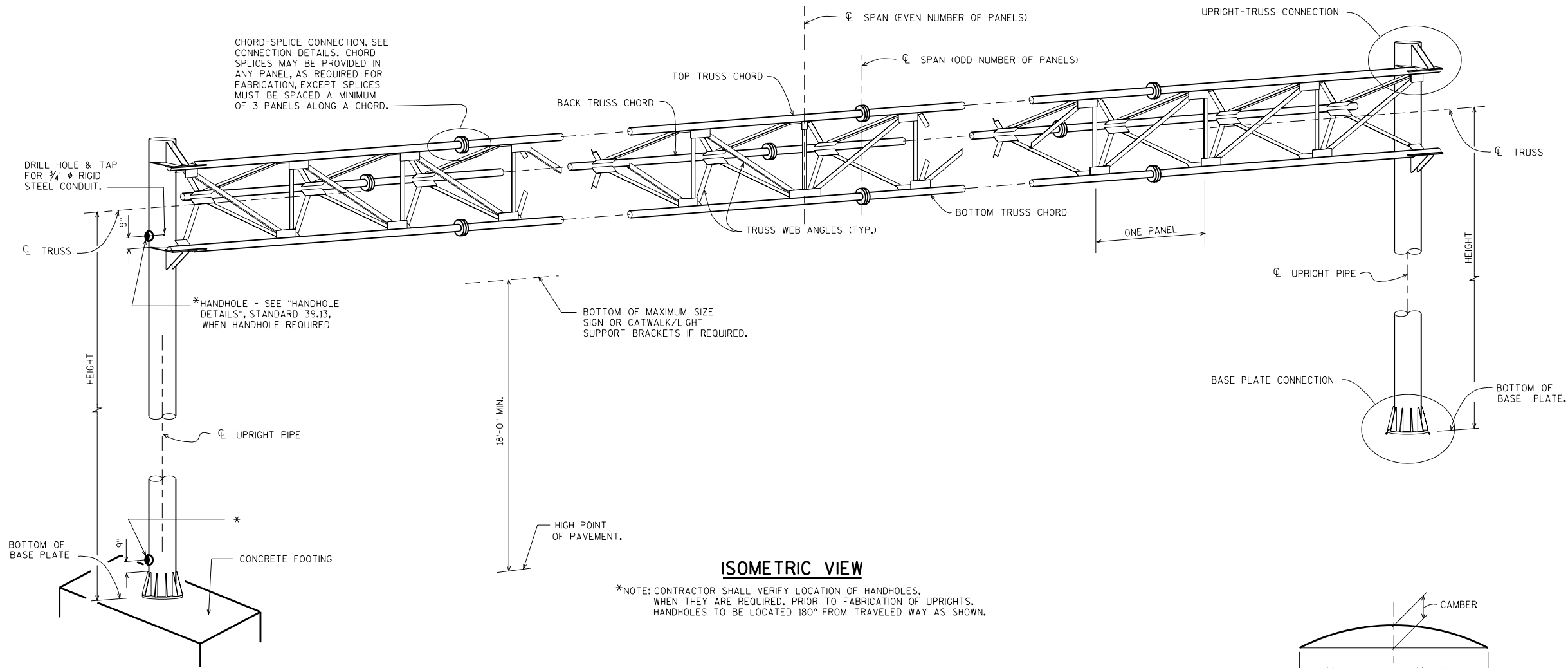
DATE:
1/99



COUPLING DETAIL

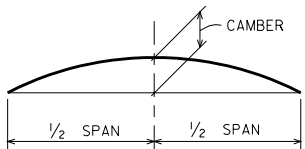
STRUCTURE	COLUMN O.D. X THK.	ANCHOR BOLTS	BASE PLATE THICKNESS (IN.)	STIFFENER PLATE THICKNESS (IN.)	STIFFENER PLATE HEIGHT (IN.)	τ_w (IN.)

STANDARD	39.3
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ISOMETRIC VIEW

*NOTE: CONTRACTOR SHALL VERIFY LOCATION OF HANDHOLES, WHEN THEY ARE REQUIRED. PRIOR TO FABRICATION OF UPRIGHTS, HANDHOLES TO BE LOCATED 180° FROM TRAVELED WAY AS SHOWN.

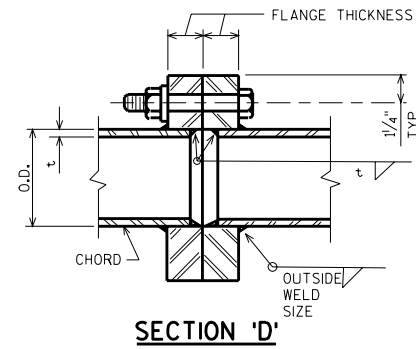
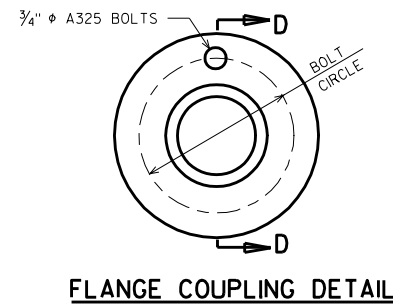
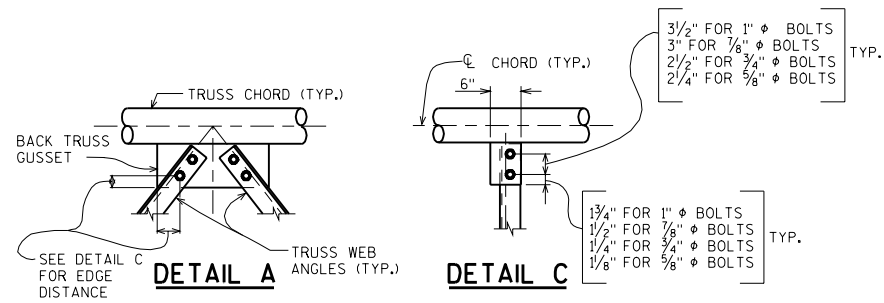


CAMBER DIAGRAM

SPAN SIGN STRUCTURE NOTES

- 1) SIGN STRUCTURE MATERIALS SHALL BE AS FOLLOWS:
 UPRIGHT & CHORDS (STEEL PIPE) -> API-5L-X42 (42,000 P.S.I. YIELD)
 WEBS AND SPLICES (STEEL ANGLES) -> ASTM A709 GRADE 36
 STEEL PLATES -> ASTM A709 GRADE 36
 WELD METAL -> E70XX
 BOLTS (EXCEPT ANCHOR BOLTS) -> ASTM A325
- 2) STEEL ANCHOR BOLTS SHALL BE AASHTO 314 GRADE 55, NUTS FOR ANCHOR BOLTS SHALL BE ASTM A563 GRADE A HEAVY HEX.
- 3) ALL STEEL ITEMS SHALL BE GALVANIZED AS FOLLOWS:
 STRUCTURAL SHAPES AND PLATES -> ASTM A 123
 ALL NUTS, BOLTS AND WASHERS -> ASTM A 153 CLASS C OR D DEPENDING ON SIZE
- 4) ALL HIGH STRENGTH BOLTS, NUTS, AND WASHERS, EXCEPT ANCHOR BOLTS AND SIGN CONNECTION U-BOLTS SHALL MEET THE REQUIREMENTS OF STANDARD SPEC. 506.2.5 AND BE INSTALLED IN ACCORDANCE WITH STANDARD SPEC. 506.3.12. ANCHOR BOLTS SHALL HAVE DOUBLE NUTS.
- 5) CONCRETE SHALL BE GRADE A WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH (F'c) OF 3,500 P.S.I. FOR ALL ENVIRONMENTAL CLASSIFICATIONS.
- 6) REINFORCING STEEL SHALL BE ASTM A615 GRADE 60.
- 7) ALTERNATE DESIGNS FOR THIS STRUCTURE ARE NOT ALLOWED. DIFFERENT SIZE AND STRENGTH OF MEMBERS MAY BE SUBSTITUTED WITH THE APPROVAL OF THE OFFICE OF DESIGN.
- 8) DO NOT GROUT THE SPACE BETWEEN TOP OF FOOTING AND BOTTOM OF BASE PLATE.
- 9) SHOP DRAWINGS FOR THIS STRUCTURE ARE REQUIRED AND FABRICATION SHALL NOT BEGIN UNTIL THESE SHOP DRAWINGS ARE APPROVED.
- 10) THE STRUCTURE MUST BE ASSEMBLED AFTER GALVANIZING AND PRIOR TO SHIPMENT TO THE SITE TO ASSURE FIT UP. IT MAY BE DISASSEMBLED IN SECTIONS FOR SHIPPING. ALL HIGH STRENGTH BOLTED CONNECTIONS (WEB TO CHORD GUSSET) BETWEEN CHORD SPLICE POINTS SHALL BE FULLY TIGHTENED IN THE SHOP. THE TOWER/CHORD, CHORD SPLICE, AND ACROSS THE SPLICE WEB TO CHORD GUSSET CONNECTIONS SHALL BE FULLY TIGHTENED IN FIELD.
- 11) THE DESIGN WIND SPEED IS 85 M.P.H. WITH A 30 PERCENT GUST FACTOR.
- 12) PROVIDE A CAMBER WITH THE MAXIMUM UPWARD DEFLECTION AS CALLED FOR ON THE CAMBER DIAGRAM. INDICATE ON THE SHOP DRAWINGS THE METHOD TO BE USED TO PROVIDE THE REQUIRED CAMBER.
- 13) SIGN PANELS ATTACHED TO THE TRUSS SHALL BE CENTERED (IN ELEVATION) ON THE STRUCTURE. SIGN PANELS SHALL BE ALUMINUM.
- 14) EXCEPT FOR ANCHOR BOLTS, ALL BOLT HOLE DIAMETERS SHALL BE EQUAL TO THE BOLT DIAMETER PLUS 1/16". PRIOR TO GALVANIZING, HOLE DIAMETERS FOR ANCHOR BOLTS SHALL NOT EXCEED THE BOLT DIAMETER PLUS 1/2".
- 15) CONTRACTOR SHALL ATTACH SIGN PANELS TO THE TRUSS CHORDS AS SHOWN ON "TYPICAL SIGN CONNECTION", STANDARD 39.5. SIGN PANELS AND HARDWARE REQUIRED TO ATTACH SIGNS TO TRUSS CHORDS, INCLUDING ALL W5 X 3.7 ALUMINUM SIGN SUPPORT BRACKETS, U-BOLTS, AND POST CLIP HARDWARE, WILL BE SUPPLIED AND DELIVERED TO SITE BY OTHERS.
- 16) ANCHOR BOLTS SHALL BE PROVIDED WITH TEMPLATES TOP AND BOTTOM TO MAINTAIN VERTICAL ALIGNMENT AND SPACING DURING CONCRETE PLACEMENT. TEMPLATES MAY NOT BE WELDED TO THE ANCHOR BOLTS.
- 17) SIGNS OR BLANKS SHALL BE INSTALLED ON TRUSS AT TIME OF ERECTION. BLANKS SHALL BE 1/4 THE LENGTH OF BRIDGE, 2'-0" DEEPER THAN C TO C OF CHORDS & SHALL BE CENTERED ON THE BRIDGE.
- 18) SHOP WELDED CONNECTIONS MAY BE USED IN LIEU OF BOLTED CONNECTIONS IN TRUSS IF UNIT CAN BE GALVANIZED IN ONE PIECE.

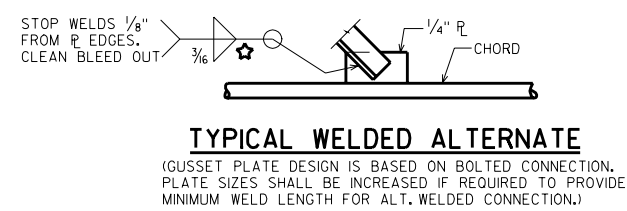
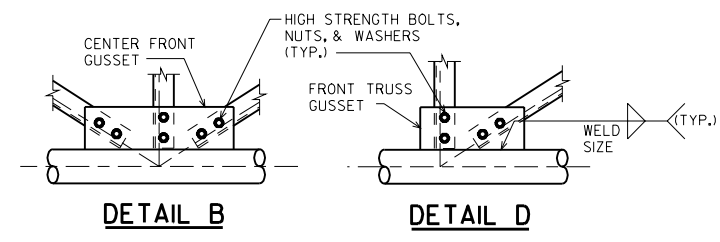
3-CHORD STEEL SIGN BRIDGE	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: _____	DATE: 1/99



COUPLING DESIGN

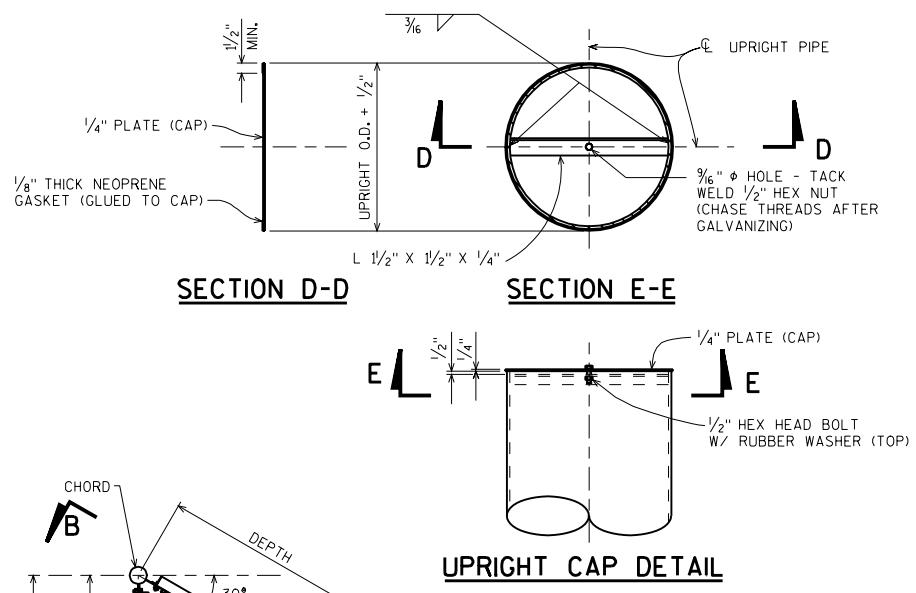
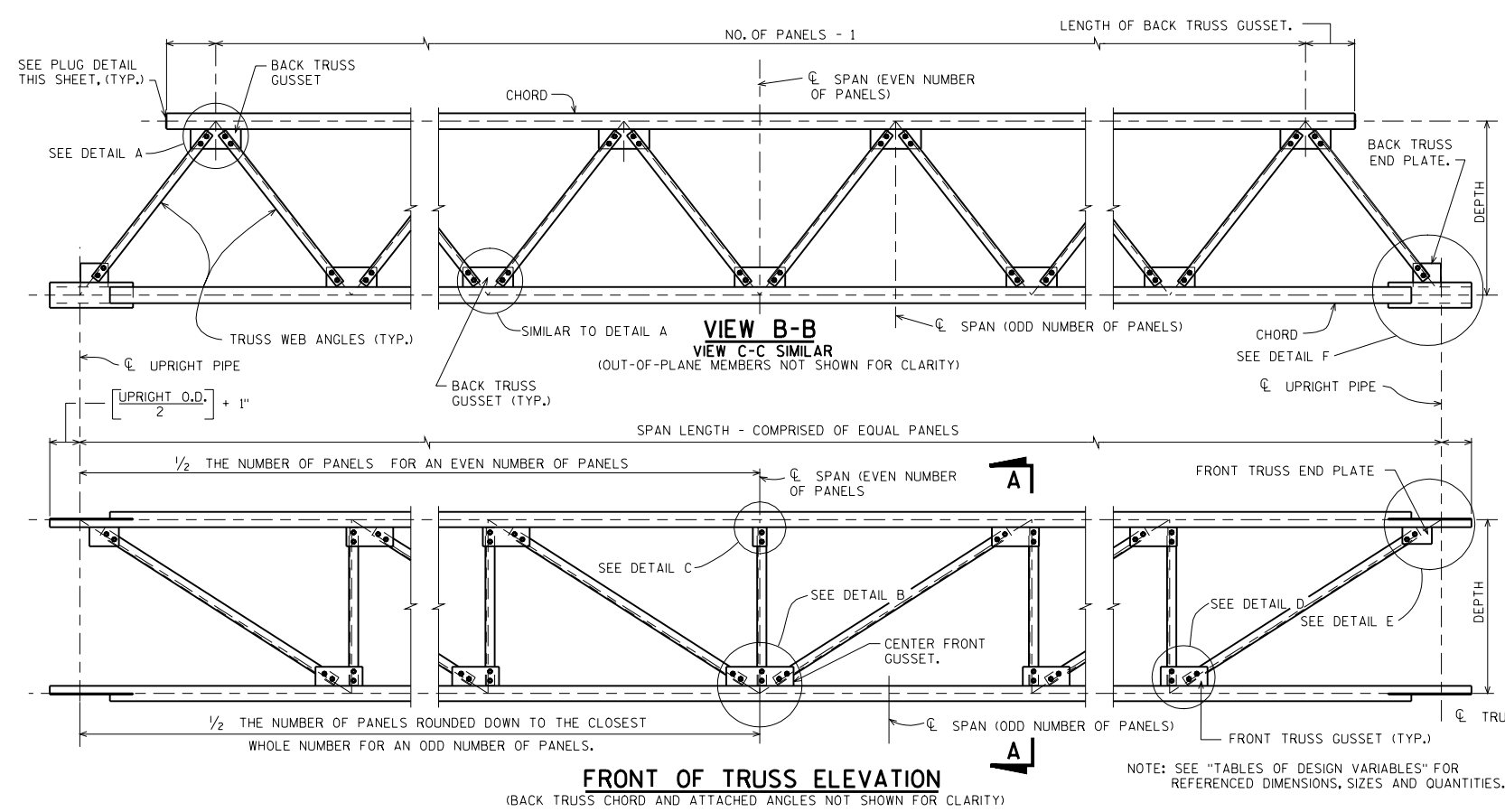
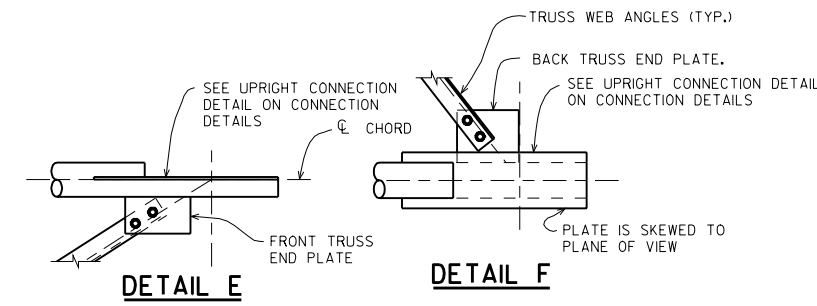
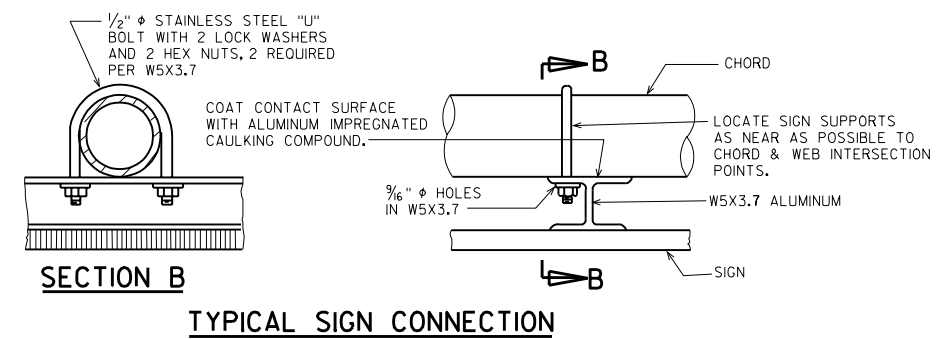
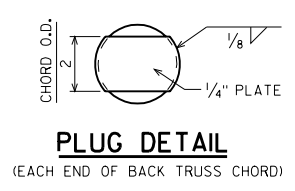
*CHORD SIZE (O.D. X t)	NUMBER OF BOLTS REQ'D.	BOLT CIRCLE DIAMETER	FLANGE THICKNESS	OUTSIDE WELD SIZE

*PIPE OUTSIDE DIAM. IN INCHES X PIPE WALL THICKNESS IN INCHES



MINIMUM LENGTH OF 3/16" WELD

BOLT SIZE	MINIMUM LENGTH OF 3/16" WELD
5/8"	6 1/2"
3/4"	9 1/2"
7/8"	12 1/2"
1"	16 1/2"

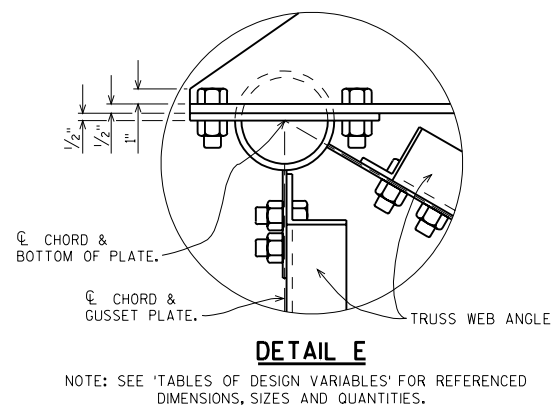
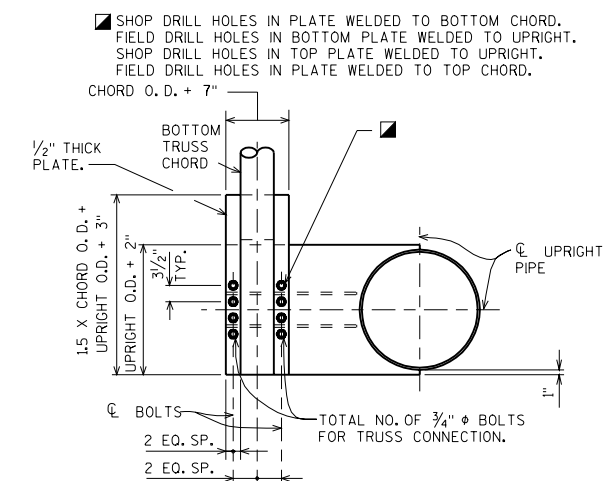
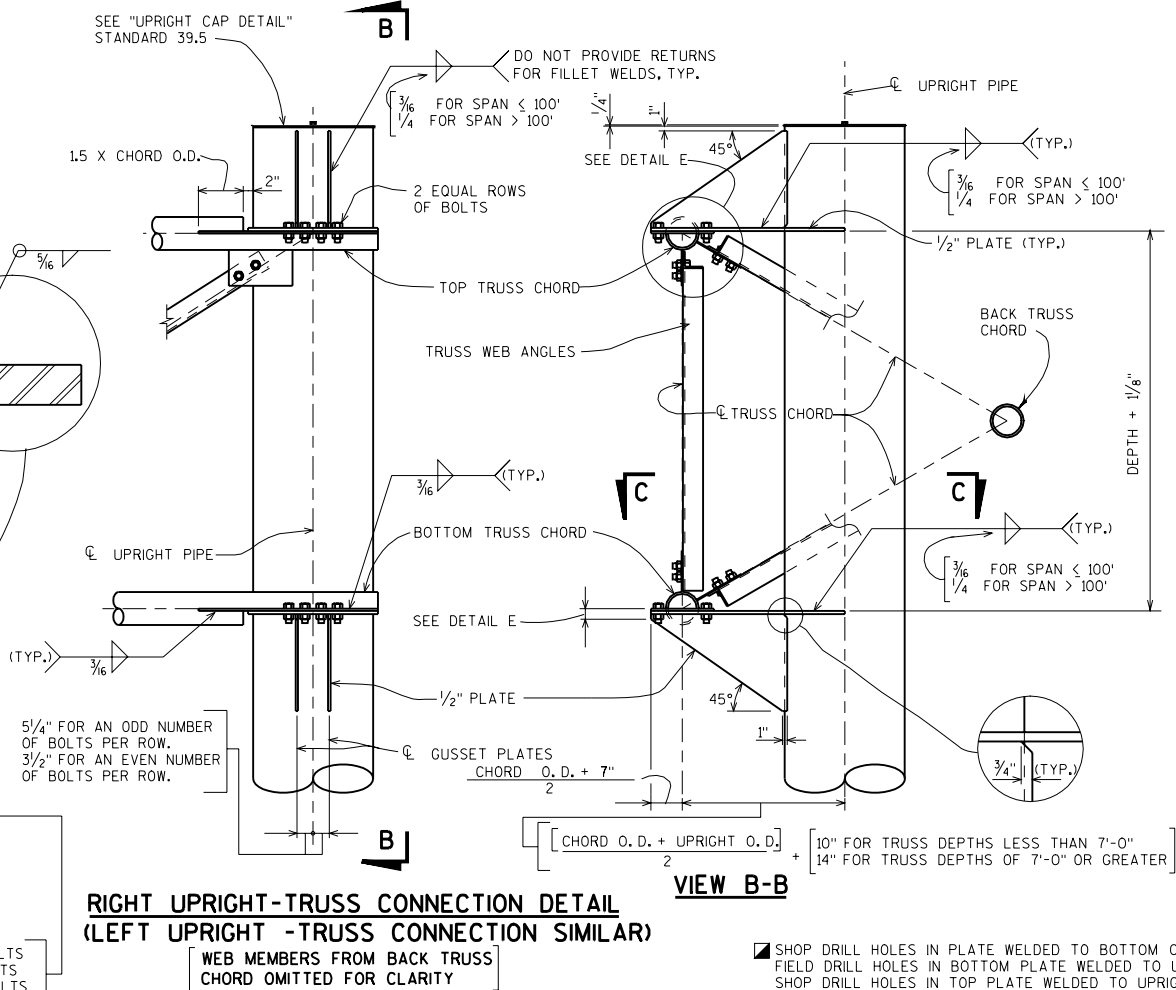
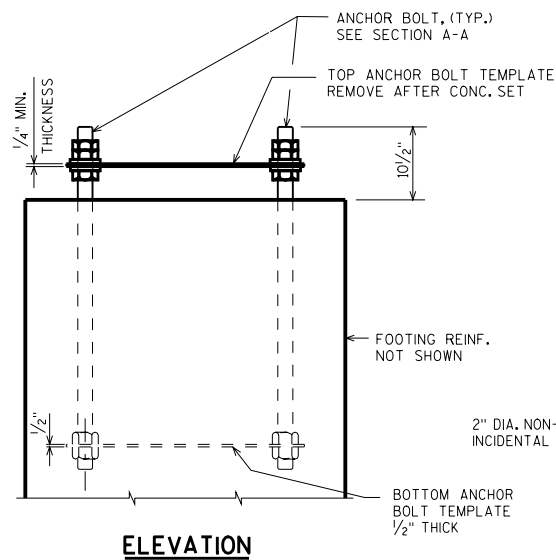


3-CHORD STEEL SIGN BRIDGE TRUSS ELEVATION

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 1/99

NOTE: SEE "TABLES OF DESIGN VARIABLES" FOR REFERENCED DIMENSIONS, SIZES AND QUANTITIES.

[illegible]

*PIPE OUTSIDE DIAMETER IN INCHES X PIPE WALL THICKNESS IN INCHES

3-CHORD STEEL SIGN BRIDGE CONNECTION AND BASE DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____	DATE: 1/99
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TRUSS DESIGN								
STRUCTURE	SPAN (FT.)	DEPTH (IN.)	CHORD SIZE ①	WEB ANGLE SIZE (IN.)	PANELS (NO. & LENGTH)	WEB BOLT SIZE	TRUSS CONN. ②	CAMBER (IN.)

GUSSET PLATE DESIGN								
STRUCTURE	SPAN (FT.)	THICK- NESS	BACK TRUSS	FRONT TRUSS	CENTER FRONT	BACK TRUSS END PLATE	FRONT TRUSS END PLATE	WELD SIZE

- ① OUTSIDE DIAMETER (O.D.) X WALL THICKNESS IN INCHES.
- ② NUMBER OF A325 3/4" ϕ BOLTS PER CONNECTION.
(NOTE: ONE TRUSS HAS FOUR CONNECTIONS.)
- ③ "HEIGHT" IS MEASURED FROM ϕ TRUSS TO BOTTOM OF BASE PLATE.
LEFT AND RIGHT SIDES ARE WITH RESPECT TO THE DIRECTION VIEWED
FROM AS SHOWN ON "SIGN BRIDGE LAYOUT" SHEET.

UPRIGHT DESIGN				
STRUCTURE	SPAN (FT.)	"HEIGHT" (FT.) ③		UPRIGHT SIZE ①
		LEFT	RIGHT	

- NOTES
- DESIGN IS TO BE BASED ON THE FOLLOWING:
1. MAXIMUM SIGN DEPTH = 12'-0"

2. SIGN AREA EQUAL TO (.6 X SPAN) X 12 FEET HIGH.

3. NO CATWALK.

4. ONE DIRECTION TRAFFIC (SIGNS ON ONE SIDE).

5. NO FUTURE WIDENING OR RAISING OF STRUCTURE PLANNED.

6. TYPE 1 SIGN PANELS (EXTRUDED ALUMINUM SECTIONS WITH REFLECTIVE BACKING) & ALUMINUM BRACKETS.

7. DESIGN 4 CHORD SYSTEM (PER STANDARD 39.2 & 39.3) WHEN ANY OF CRITERIA (1) THROUGH (6) ARE VIOLATED.

8. SIGNS TO BE CENTERED ON TRUSS.

9. DESIGNER IS TO PROVIDE DESIGN (FILL IN DESIGN VARIABLE BOXES IN TABLE ABOVE AND AS SHOWN ON STANDARDS 39.5 & 39.6) FOR EACH SIGN BRIDGE STRUCTURE. OTHER DETAILS SHOWN IN STD. 39.5 & 39.6 ARE ADEQUATE PROVIDED THE CRITERIA SHOWN ABOVE AND IN THE BRIDGE MANUAL ARE FOLLOWED.

10. STRUCTURE IS ANALYZED AS A SPACE FRAME WITH CHORDS BEING CONSIDERED CONTINUOUS MEMBERS PINNED TO THE UPRIGHT BRACKETS. WEB MEMBERS ARE CONSIDERED PINNED AT ENDS BUT ARE DESIGNED FOR ECCENTRIC END CONNECTIONS.

3-CHORD STEEL SIGN BRIDGE
DESIGN VARIABLES

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99



3'-6 $\frac{1}{4}$ "

1 $\frac{3}{4}$ "

$\frac{7}{8}$ "

1 $\frac{1}{2}$ "

4 $\frac{1}{2}$ "

1 $\frac{3}{4}$ "

$\frac{5}{16}$ "

6"

3"

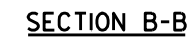
1 $\frac{1}{2}$ "

4 $\frac{1}{2}$ "

10"

3/16" Ø HOLE FOR 1/2" Ø ROD.

3/16" TYP

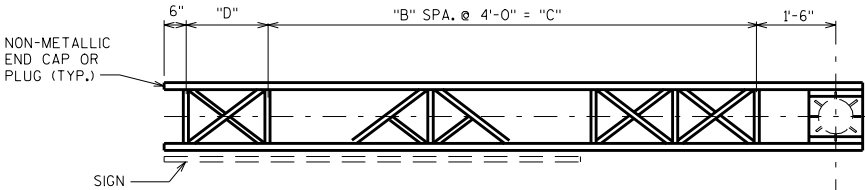


APPROVED: _____

STANDARD	39.9
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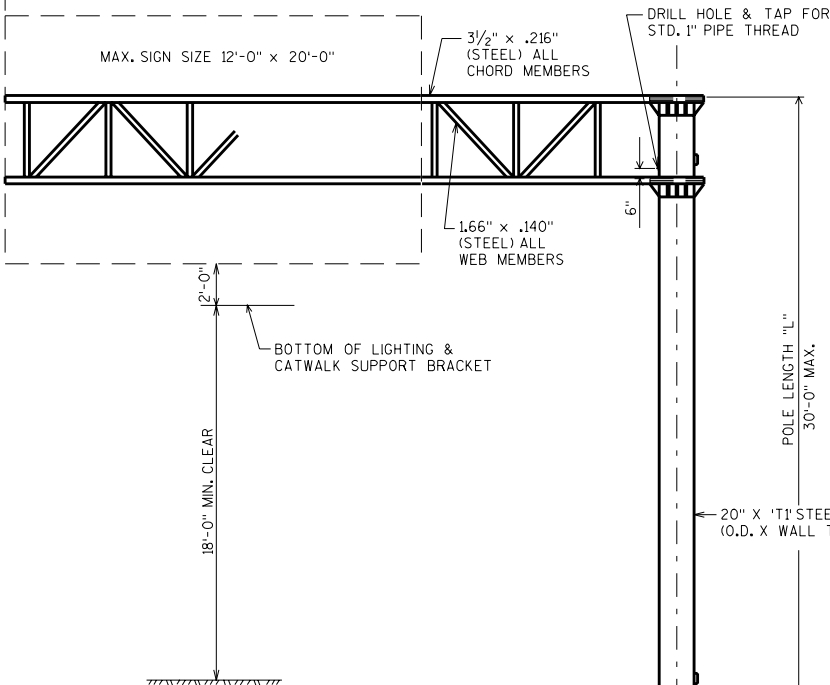


END PANEL "D" = 2'-0" MINIMUM
= 6'-0" MAXIMUM



PLAN

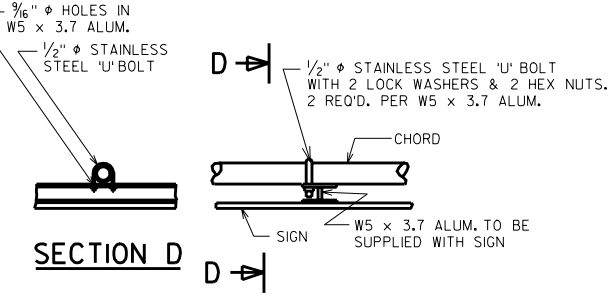
LENGTH "A" END OF TRUSS TO C COLUMN
33'-0" MAX.



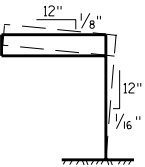
ELEVATION

END VIEW

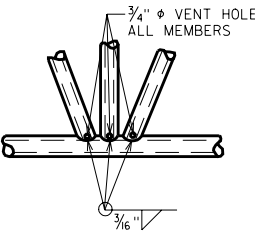
STRUCTURE	"A"	"L"	"B"	"C"	"T1"	"D"



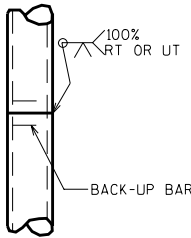
TYPICAL SIGN CONNECTION



CAMBER DIAGRAM



TRUSS JOINT DETAILS



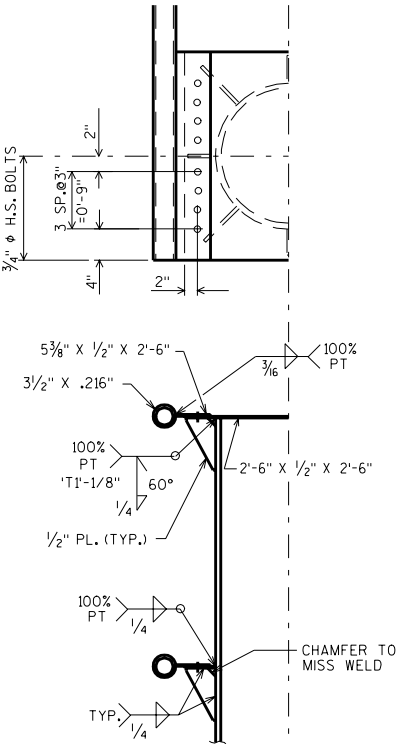
OPTIONAL COLUMN OR CHORD SPLICE DETAIL

GENERAL NOTES

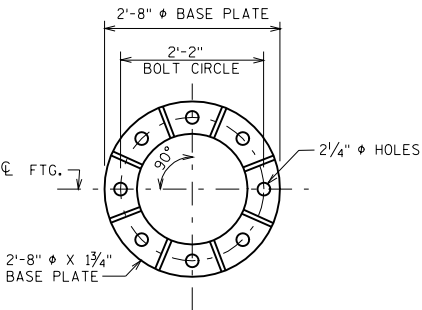
DRAWINGS SHALL NOT BE SCALED.
DESIGNED ACCORDING TO A.A.S.H.T.O. "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"
WIND VELOCITY = 85 M.P.H.

ALLOWABLE DESIGN STRESSES

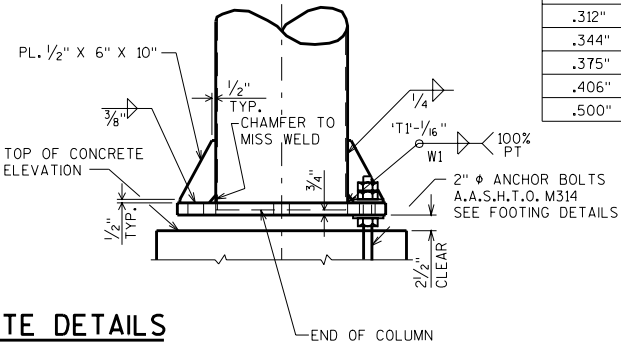
CHORDS & COLUMN (INCLD. HANDHOLE) — API-5L-X42 — fy=42,000 P.S.I.
ALL OTHER PIPE — A53, GRADE B — fy=35,000 P.S.I.
PLATES & BARS — A709 — fy=36,000 P.S.I.
ANCHOR BOLTS — A.A.S.H.T.O. M314 — fy=55,000 P.S.I.
HIGH STRENGTH BOLTS — A325 — fy=92,000 P.S.I.
STRUCTURAL MEMBERS GALVANIZED A123
HARDWARE GALVANIZED — A153 CLASS C



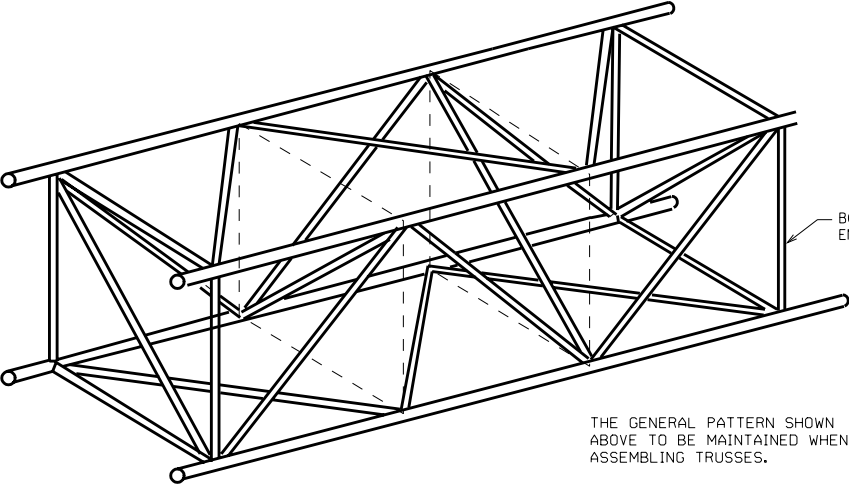
TRUSS TO COLUMN CONNECTION DETAILS



BASE PLATE DETAILS



WELD SIZE "W1"	POLE "T1"	"W1"
.281"	1/4"	1/4"
.312"	1/4"	1/4"
.344"	5/16"	5/16"
.375"	3/8"	3/8"
.406"	3/8"	3/8"
.500"	3/8"	3/8"



TYPICAL TRUSS SECTION

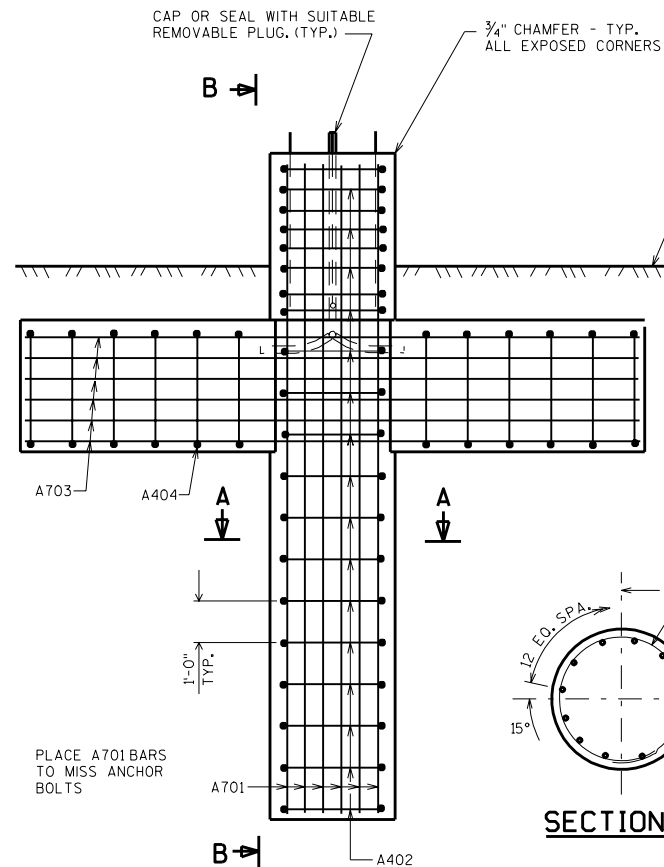
THE GENERAL PATTERN SHOWN ABOVE TO BE MAINTAINED WHEN ASSEMBLING TRUSSES.

GALVANIZED STEEL CANTILEVER SIGN TRUSS

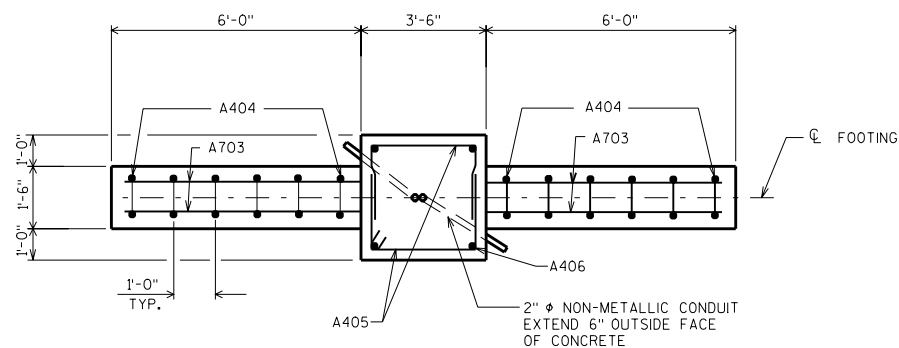
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

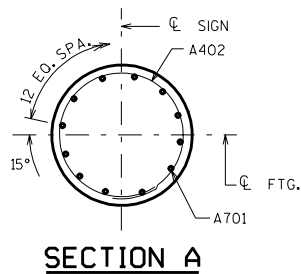
DATE:
1/99



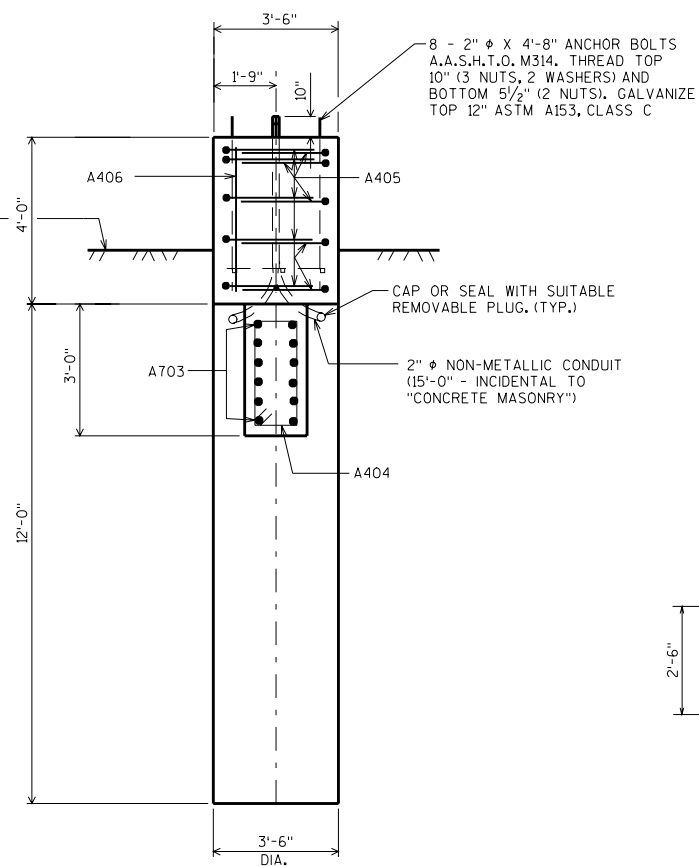
ELEVATION
(8 C.Y.)



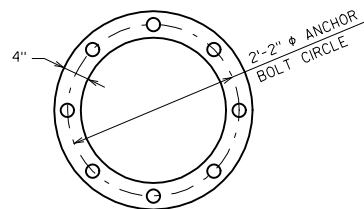
PLAN



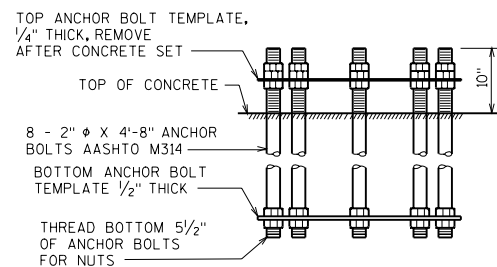
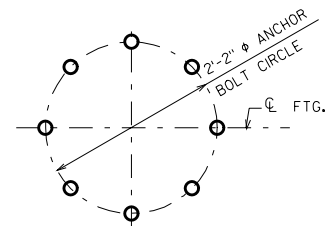
SECTION A



SECTION B



TOP VIEW OF TOP & BOTTOM TEMPLATES



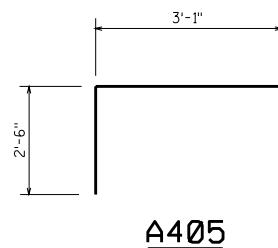
ANCHOR BOLT DETAILS

NOTE:
THE FIRST OR FIRST TWO DIGITS OF A
BAR MARK SIGNIFIES THE BAR SIZE.

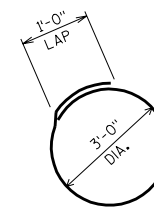
BILL OF BARS

980 LB.

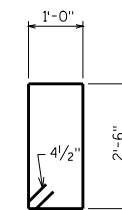
BAR MARK	COAT	NO. REQ'D	LENGTH	BEVT	CUT. DIAG.	BUN-DLE	LOCATION
A701		12	15'-6"				FOOTING - COLUMN/TOP
A402		16	10'-6"	X			FOOTING - COLUMN/TOP
A703		12	15'-0"				FOOTING - WINGS
A404		12	7'-6"	X			FOOTING - WINGS
A405		10	7'-11"	X			FOOTING - TOP
A406		4	3'-6"				FOOTING - TOP - COLUMNS



A405



A402



A404
(STIRRUP)

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.
BAR STEEL REINFORCEMENT SHALL
BE EMBEDDED 3" CLEAR UNLESS
DETAILED OTHERWISE.

ALLOWABLE DESIGN STRESSES

CONCRETE MASONRY $f'_c=3,500$ P.S.I.
HIGH STRENGTH BAR STEEL REINFORCEMENT, $f_y=60,000$ P.S.I.
ANCHOR BOLTS A.A.S.H.T.O. M314 GRADE 60 $f_y=55,000$ P.S.I.

FOUNDATION DATA

ALLOWABLE SOIL BEARING PRESSURE = 2T/SQ. FT.

TOTAL ESTIMATED QUANTITIES (1 FTG.)

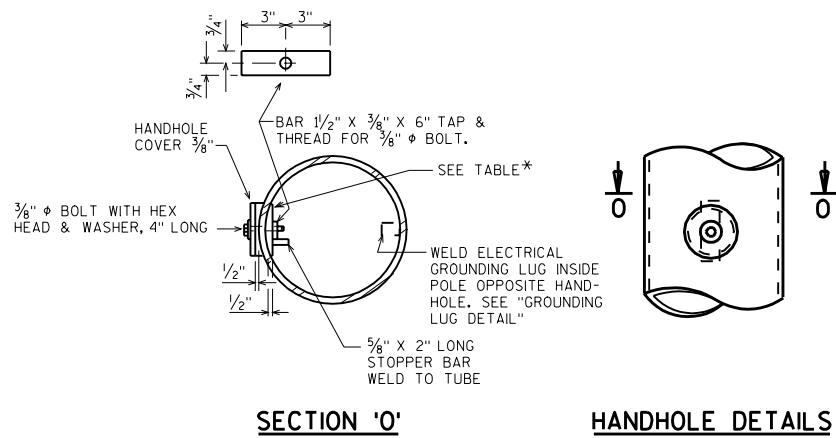
CONCRETE MASONRY, SIGN SUPPORTS 8 C.Y.
HIGH STRENGTH BAR STEEL REINFORCEMENT, SIGN SUPPORTS 980 LB.

**CANTILEVER
TRUSS FOOTING**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
1/99



SECTION 'O'

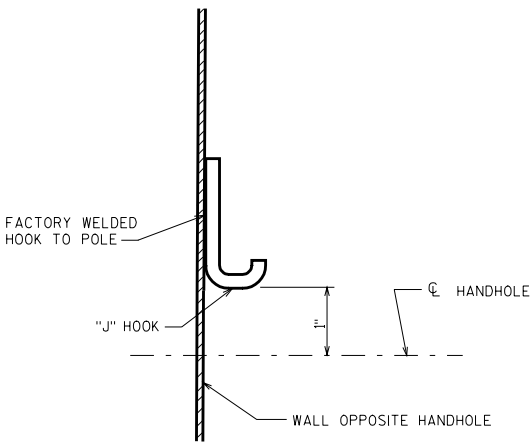
HANDHOLE DETAILS

HANDHOLE NOTES

HANDHOLES SHALL BE LOCATED IN ONE COLUMNS OF THE SIGN BRIDGE STRUCTURE IF ELECTRICALLY OPERATED DEVICES ARE INSTALLED ON/IN THE STRUCTURE. COLUMNS WITH HANDHOLES SHALL BE NEAR THE ELECTRICAL SERVICE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE ELECTRICAL SERVICE ENTRANCE WITH THE DISTRICT TRAFFIC SECTION PRIOR TO FABRICATION OF THE SIGN BRIDGE COLUMNS AND MEMBERS. CONDUIT (AS REQ'D.) SHALL BE LOCATED, PLACED AND SIZED AS SHOWN ON THE ELECTRICAL DETAIL PLAN SHEETS.

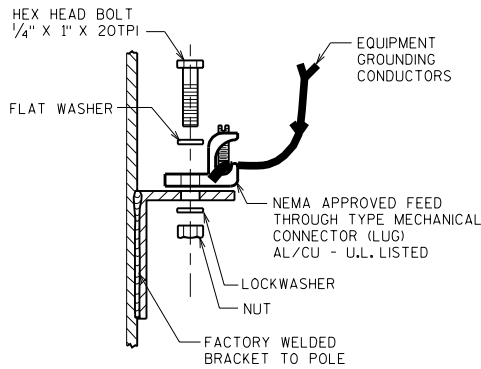
*

UPRIGHT DIAM. SIZE	HANDHOLE PIPE O.D. X MIN. THK.
UP TO AND INCLD. 16" X .375"	5.562" X .500"
GREATER THAN 16" X .375" TO AND INCLD. 24" X .562"	6.625" X .562"



TYPICAL "J" HOOK LOCATION

THE "J" HOOK SHALL BE FACTORY WELDED TO THE INSIDE OF ALL COLUMNS CONTAINING ELECTRICAL WIRING. THE "J" HOOK SHALL BE ATTACHED ABOVE THE CENTERLINE OF THE UPPER HANDHOLE AND MOUNTED DIRECTLY OPPOSITE THE HANDHOLE AS SHOWN IN THE DRAWING.



GROUNDING LUG DETAIL

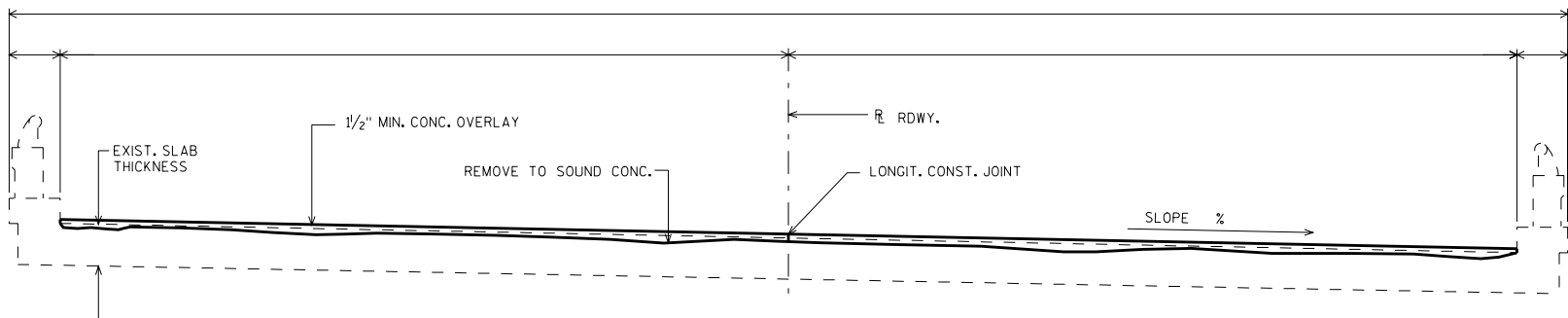
NUT, BOLT AND WASHERS SHALL BE STAINLESS STEEL

HANDHOLE DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

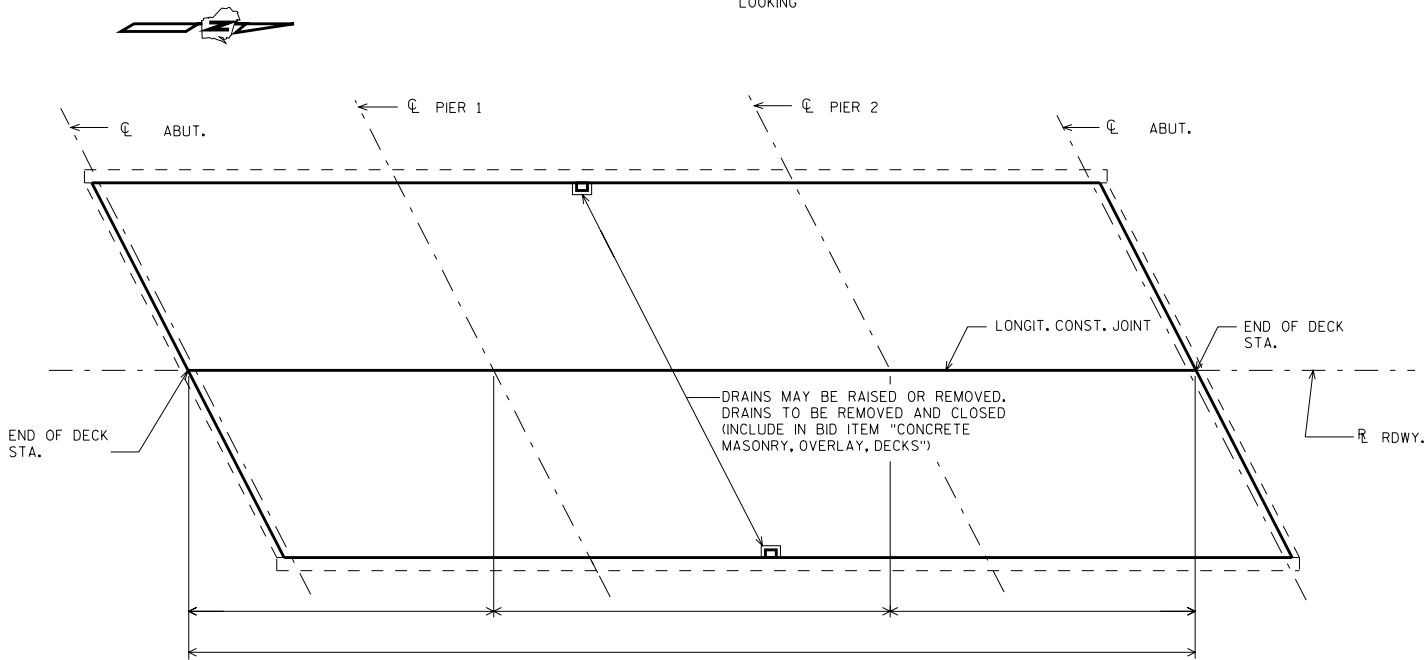
APPROVED: _____

DATE:
1/99



CROSS SECT. THRU RDWY.

LOOKING



PLAN

NOTE:

PROFILE GRADE LINE SHALL BE DETERMINED BASED ON A MINIMUM OVERLAY THICKNESS OF 1/2" PLACED ABOVE THE DECK SURFACE AFTER CLEANING. EXPECTED AVERAGE OVERLAY THICKNESS IS 2" (OR AS GIVEN BY THE DESIGN ENGINEER). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN 1/2", CONTACT THE STRUCTURES DESIGN SECTION.

A MIN. OF 1 INCH OF CONCRETE SHALL BE REMOVED FROM THE ENTIRE BRIDGE DECK UNDER THE BID ITEM "CLEANING, DECKS".

TOP OF EXISTING DECK ELEVATIONS SHALL BE DETERMINED FROM A FIELD SURVEY AT LOCATIONS DEEMED NECESSARY FOR ESTABLISHING OVERLAY THICKNESS FOR ACCURATE RATINGS AND POINT OF MINIMUM THICKNESS.

FOR CROSS SECTIONS NOT IN SUPERELEVATION TRANSITIONS THE PREFERRED MINIMUM SLOPE IS 2%.

ANY EXCAVATION REQ'D. TO COMPLETE THE OVERLAY OR THE PAVING BLOCK AT ABUTS. IS INCIDENTAL TO THE BID ITEM, "CONCRETE MASONRY, OVERLAY, DECKS".

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

UNDER THE BID ITEM "CONCRETE MASONRY ANCHORS, TYPE "S", ANCHORED REINFORCING STEEL SHALL BE PAID FOR SEPARATELY AS PROVIDED IN SECTION 505 OF THE STANDARD SPECIFICATIONS FOR BAR STEEL REINFORCEMENT.

DESIGN DATA

LIVE LOAD: _____

INVENTORY RATING: HS- _____

OPERATIONAL RATING: HS - _____

MAXIMUM STANDARD PERMIT VEHICLE LOAD = ___ Kips

ULTIMATE DESIGN STRESSES: _____

CONCRETE MASONRY SUPERSTRUCTURE f'_c = 4,000 P.S.I.

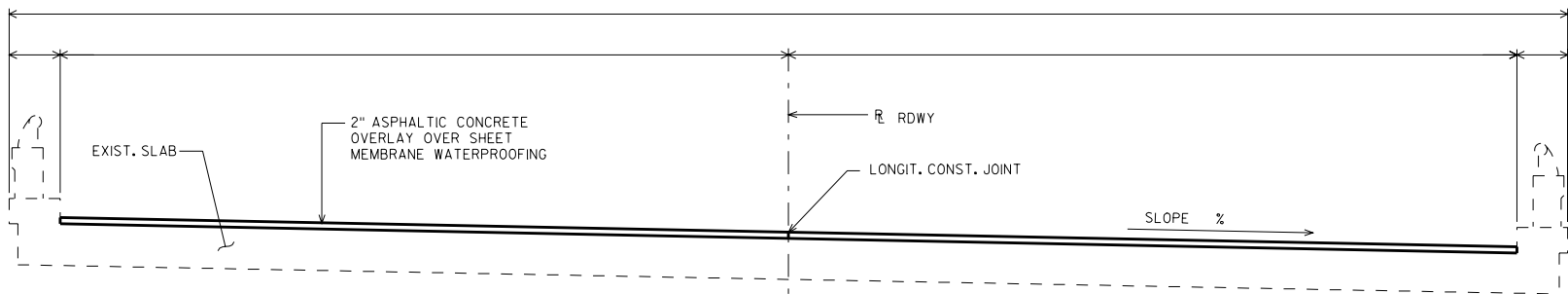
TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	TOTAL
CONCRETE MASONRY, OVERLAY, DECKS	C.Y.	
CLEANING, DECKS	S.Y.	
PREPARATION, DECKS, TYPE 1	S.Y.	
PREPARATION, DECKS, TYPE 2	S.Y.	
PROTECTIVE SURFACE TREATMENT	S.Y.	
POSSIBLE ADDITIONAL BID ITEMS		
FULL DEPTH DECK REPAIR	S.Y.	
CURB REPAIR	L.F.	
JOINT REPAIR	S.Y.	
CONCRETE SURFACE REPAIR	S.F.	
RUPTURED VOID REPAIR	S.Y.	
EPOXY CRACK SEALING	L.F.	
EXPANSION DEVICE, STRUCTURE B- -	L.S.	
CONCRETE MASONRY ANCHORS, TYPE L, NO. BAR	EACH	
CONCRETE MASONRY ANCHORS, TYPE S, NO. BAR	EACH	
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	LB.	
ADJUSTING FLOOR DRAINS	EACH	
DECK GRINDING	S.Y.	
REMOVING CONCRETE MASONRY DECK OVERLAY	S.Y.	

CONCRETE OVERLAY

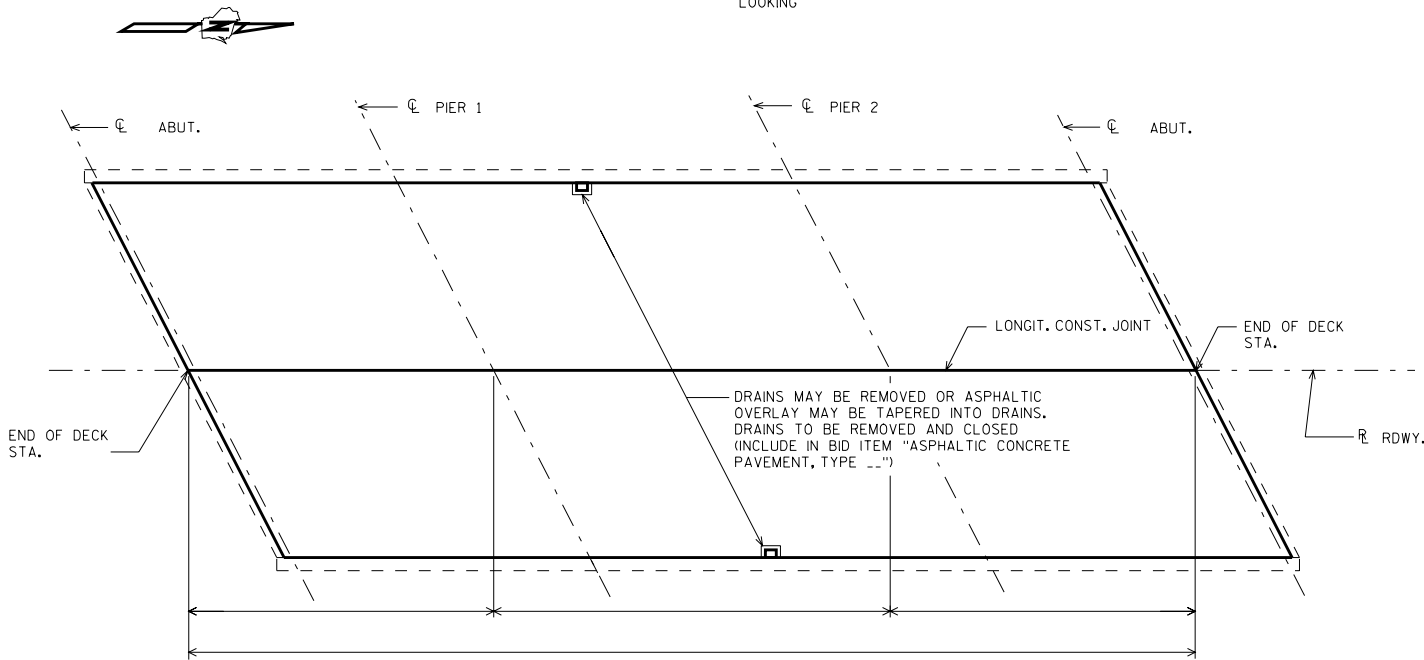
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 8/99



CROSS SECT. THRU RDWY.

LOOKING



PLAN

NOTE:

PROFILE GRADE LINE SHALL BE DETERMINED BASED ON A MINIMUM OVERLAY THICKNESS OF 2" PLACED ABOVE THE DECK SURFACE AFTER CLEANING. EXPECTED AVERAGE THICKNESS IS 2" (OR AS GIVEN BY THE DESIGN ENGINEER). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN 1/2", CONTACT THE STRUCTURES DESIGN SECTION. TOP OF EXISTING DECK ELEVATIONS SHALL BE DETERMINED FROM A FIELD SURVEY AT LOCATIONS DEEMED NECESSARY FOR ESTABLISHING OVERLAY THICKNESS FOR ACCURATE RATINGS AND POINT OF MINIMUM THICKNESS.

FOR CROSS SECTIONS NOT IN SUPERELEVATION TRANSITIONS THE PREFERRED MINIMUM SLOPE IS 2%.

ANY EXCAVATION REQ'D. TO COMPLETE THE OVERLAY OR THE PAVING BLOCK AT ABUTS. IS INCIDENTAL TO THE BID ITEM, "ASPHALTIC CONCRETE PAVEMENT, TYPE --".

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

UNDER THE BID ITEM "CONCRETE MASONRY ANCHORS, TYPE "S", ANCHORED REINFORCING STEEL SHALL BE PAID FOR SEPARATELY AS PROVIDED IN SECTION 505 OF THE STANDARD SPECIFICATIONS FOR BAR STEEL REINFORCEMENT.

DESIGN DATA

LIVE LOAD:

INVENTORY RATING: HS-
OPERATIONAL RATING: HS - ---
MAXIMUM STANDARD PERMIT VEHICLE LOAD = --- Kips

ULTIMATE DESIGN STRESSES:

CONCRETE MASONRY SUPERSTRUCTURE $f'_c = 4,000$ P.S.I.

TOTAL ESTIMATED QUANTITIES

BID ITEMS	UNIT	TOTAL
ASPHALTIC CONCRETE PAVEMENT, TYPE --	C.Y.	
ASPHALTIC MATERIAL FOR PLANT MIXES	TONS	
SHEET MEMBRANE WATERPROOFING	S.Y.	
PREPARATION, DECKS, TYPE 1	S.Y.	
PREPARATION, DECKS, TYPE 2	S.Y.	
POSSIBLE ADDITIONAL BID ITEMS		
FULL DEPTH DECK REPAIR	S.Y.	
CURB REPAIR	L.F.	
JOINT REPAIR	S.Y.	
CURB RESURFACING	S.F.	
RUPTURED VOID REPAIR	S.Y.	
EPOXY CRACK SEALING	L.F.	
SAWING PAVEMENT, DECK PREPARATION AREAS	L.F.	
EXPANSION DEVICE, STRUCTURE B- -	L.S.	
CONCRETE MASONRY ANCHORS, TYPE L, NO. BAR	EACH	
CONCRETE MASONRY ANCHORS, TYPE S, NO. BAR	EACH	
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	LB.	
ADJUSTING FLOOR DRAINS	EACH	
DECK GRINDING	S.Y.	
CONCRETE MASONRY DECK PATCHING	C.Y.	
GROUTING BRIDGE DECKS	L.S.	
REMOVING CONCRETE MASONRY DECK OVERLAY	S.Y.	

ASPHALTIC OVERLAY

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
8/99

EXISTING SUBSTANDARD RAILINGS WITH POOR PERFORMANCE RECORDS SHALL BE UPGRADED OR REPLACED. SEE AASHTO "GUIDE SPECIFICATIONS FOR BRIDGE RAILINGS" OR CONTACT BRIDGE DEVELOPMENT SECTION FOR FURTHER INFORMATION.

INCORPORATE EXISTING VERT. CURB REINF. STEEL INTO NEW PARAPET.

EXIST. SLAB THICK.

NOTE: LONGIT. CONST. JOINTS IN OVERLAY MAY BE USED. LOCATION TO BE DETERMINED BY THE ENGINEER.

REMOVE TO SOUND CONC.

1 1/2" MIN. CONC. OVERLAY

CROSS SECT. THRU RDWY.

(LOOKING)

CORRUGATED POLYETHYLENE DRAINAGE PIPE. WIRE SECURELY TO REINFORCEMENT. 1 OR 2 TRANSVERSE BARS MAY BE CUT & DEFLECTED TO PLACE PIPE. IF CUT, RESTORE TO ORIGINAL POSITION & SPLICE TO NEW NO. 5 SPLICE BAR BEFORE POURING OVERLAY.

2" MIN. LAP ALL AROUND

EXIST. REINF.

2" LAP TYP.

CROSS SECT.

LONGIT. SECT.

RUPTURED VOID REPAIR

CONCRETE MASONRY ANCHORS, TYPE S, NO. 5 BARS AT 1'-4" SPACING. MIN. PULLOUT LOAD = 16 KIPS. EMBED 5 1/2" IN CONCRETE.

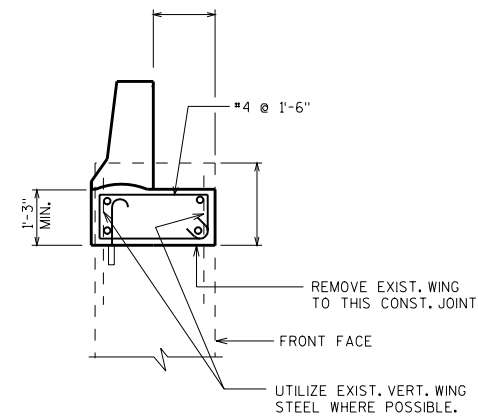
PRESERVE EXIST. VERT. RAIL POST & CURB BARS. INCORPORATE INTO NEW WORK. BEND AS NECESSARY TO PROVIDE 2" CLEAR COVER.

3/4"

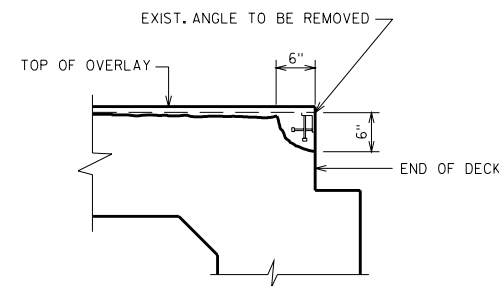
CONCRETE MASONRY ANCHORS, TYPE S, NO. 5 BARS, AT 8" SPACING. MIN. PULLOUT LOAD = 16 KIPS. EMBED 5 1/2" IN CONCRETE.

SECTION THRU PARAPET ON BRIDGE

UNDER THE BID ITEM "CONCRETE MASONRY ANCHORS, TYPE S", ANCHORED REINFORCING STEEL SHALL BE PAID FOR SEPARATELY AS PROVIDED IN SECTION 505 OF THE STANDARD SPECIFICATIONS FOR BAR STEEL REINFORCEMENT.

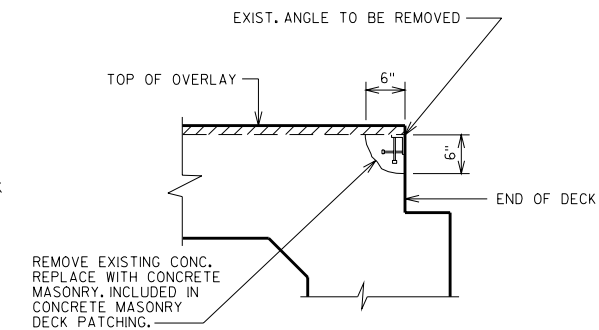


SECTION THRU PARAPET ON WING



SECTION AT END OF SLAB

CONCRETE OVERLAY



SECTION AT END OF SLAB

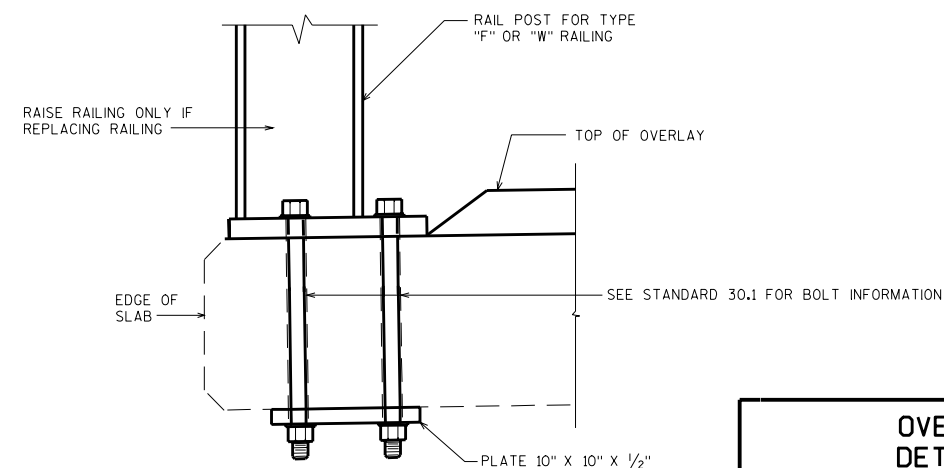
ASPHALTIC OVERLAY

PROVIDE 2" MIN. COVER

1" MIN. OR SOUND CONC.

UTILIZE EXIST. REINF.

CURB DETAIL



SECTION THRU RAILING

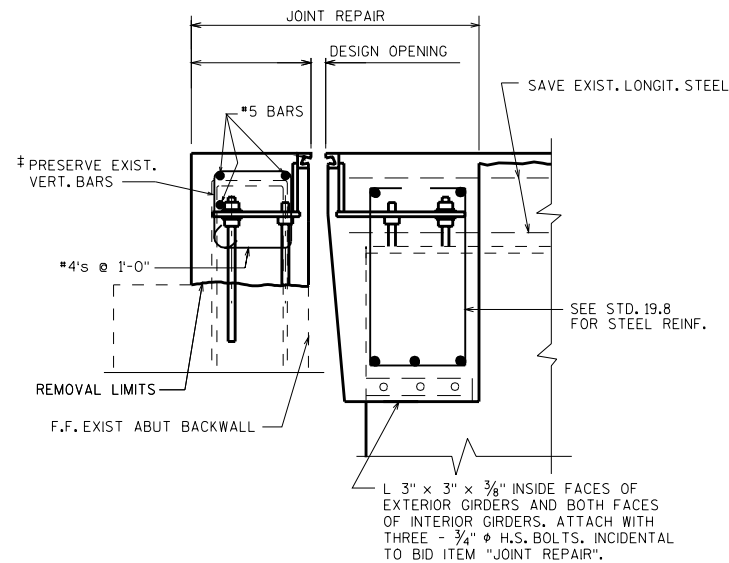
SHOWING ANCHORAGE IN SLAB

OVERLAY DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

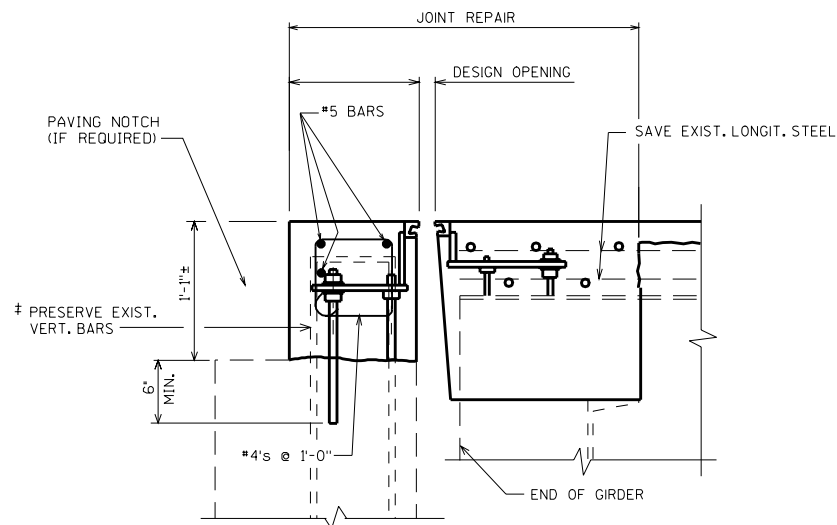
APPROVED: _____

DATE:
12/00

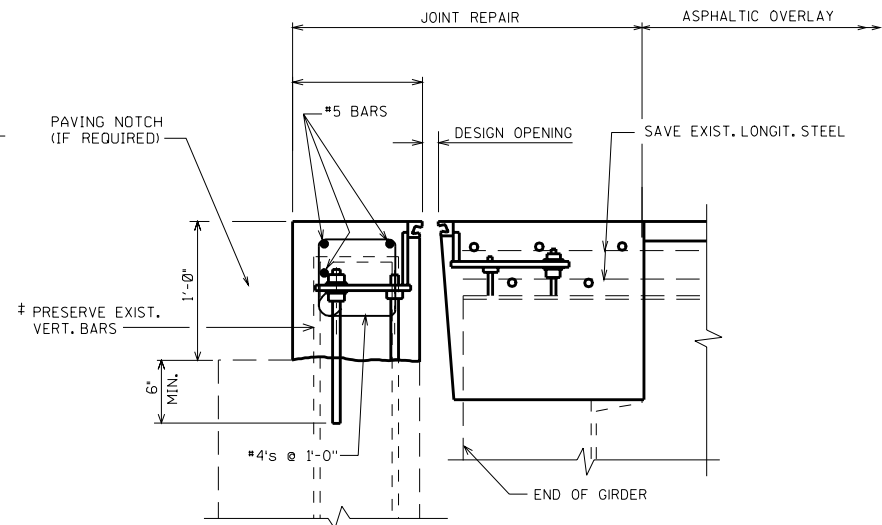


**SECTION THRU JOINT
STEEL GIRDER WITHOUT END DIAPHRAGM**

‡ IF EXISTING BARS ARE SEVERELY CORRODED OR DAMAGED DURING CONCRETE REMOVAL, REPLACE WITH "CONCRETE MASONRY ANCHORS, TYPE S, NO. 5 BAR EMBEDDED 7", MIN. PULLOUT LOAD = 18 KIPS. PLACE 4" CL. MIN. OF CONC. FACE. USE L-SHAPED #5 COATED REBAR.



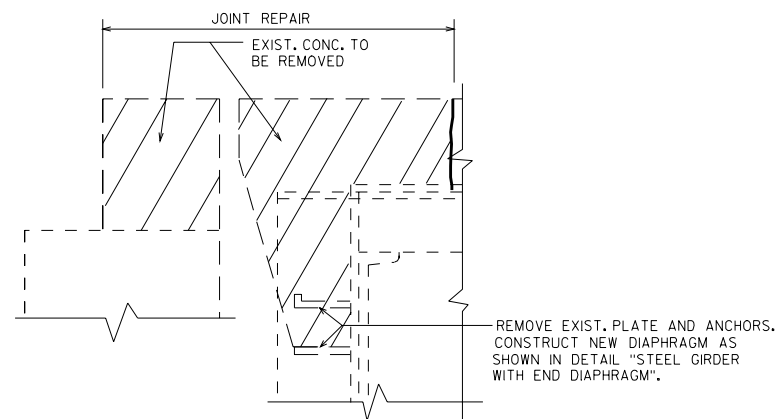
**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
CONCRETE OVERLAY**



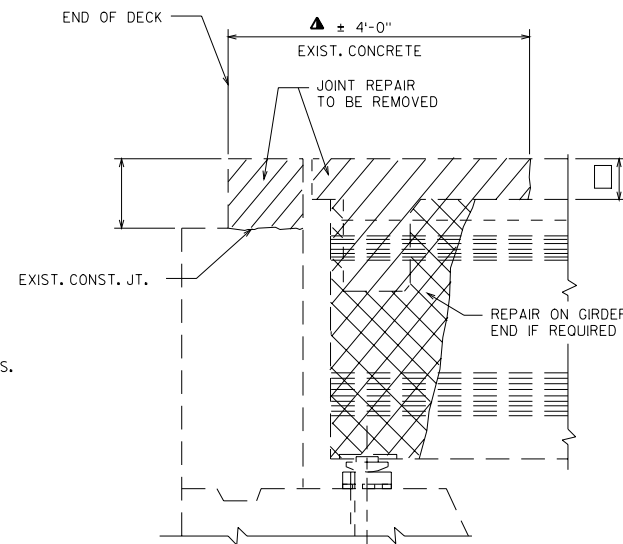
**SECTION THRU PROPOSED JOINT
STEEL GIRDER WITH END DIAPHRAGM
ASPHALTIC OVERLAY**

TOTAL ESTIMATED QUANTITIES

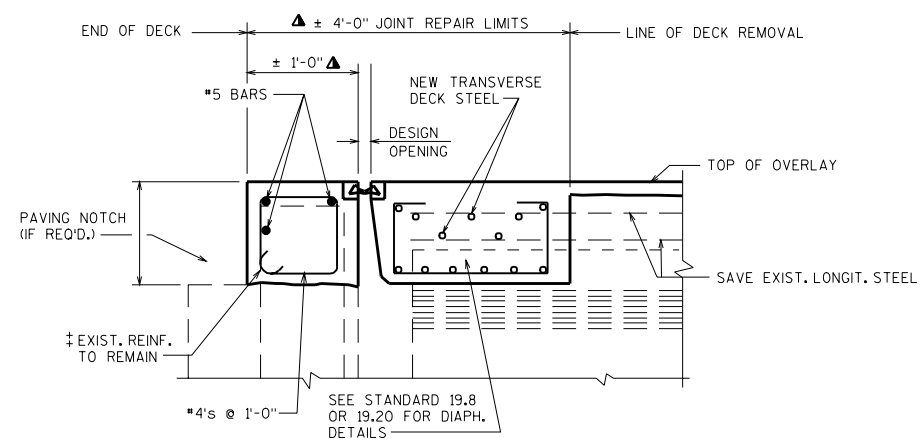
BID ITEMS	UNIT
JOINT REPAIR	S.Y.
EXPANSION DEVICE, STRUCTURE B- -	1 L.S.
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	LB.



**JOINT REPAIR-REMOVAL
STEEL GIRDER**



**JOINT REPAIR-REMOVAL
SECTION THRU JOINT-PRESTRESSED GIRDER**



▲ DIMENSIONS GIVEN ARE NORMAL TO CL OF SUBSTRUCTURE UNIT. UTILIZE EXISTING REINFORCEMENT

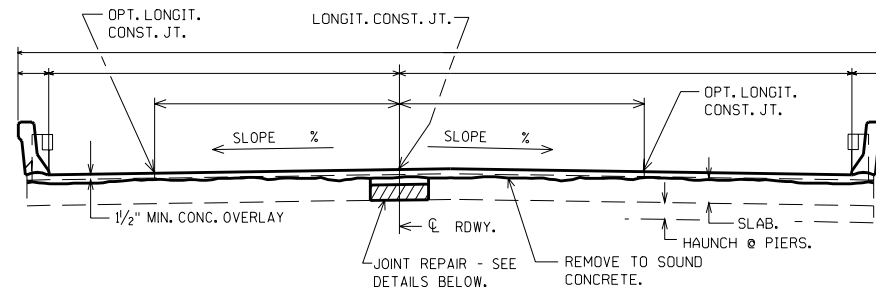
SEE STANDARD 28.1 FOR SUPPORTS USED WITH STRIP SEAL - STEEL EXTRUSIONS.

**STRIP SEALS & DIAPH.
DETAILS FOR OVERLAYS**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

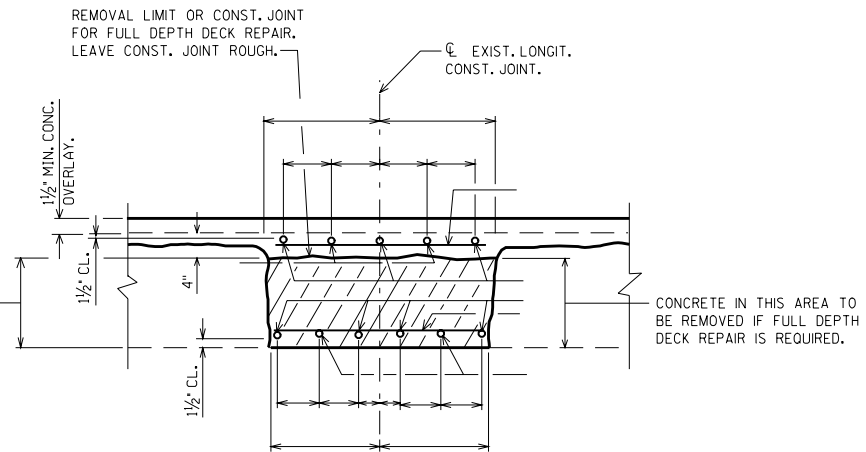
APPROVED: _____

DATE:
6/01

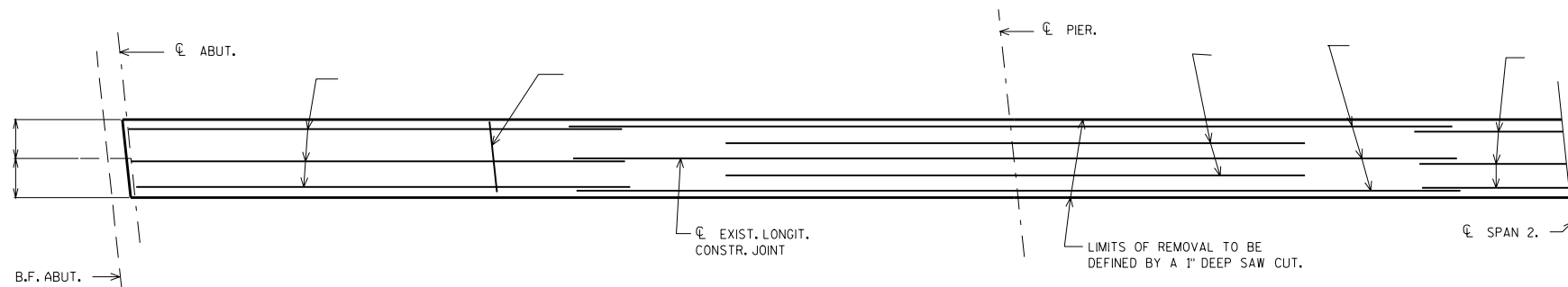


CROSS SECTION THRU ROADWAY LOOKING EAST

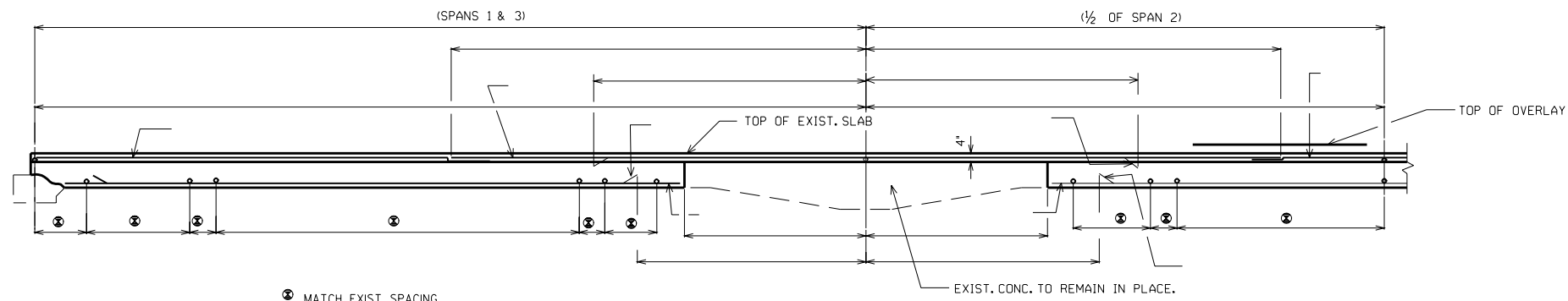
CONCRETE IN THIS AREA TO BE INCLUDED IN BID ITEM "CONCRETE MASONRY, BRIDGES" IF JOB REQUIRES OTHER "CONCRETE MASONRY, BRIDGES". OTHERWISE INCLUDE IN BID ITEM "CONCRETE MASONRY, OVERLAY, DECKS".



TYP. SECTION THRU JOINT



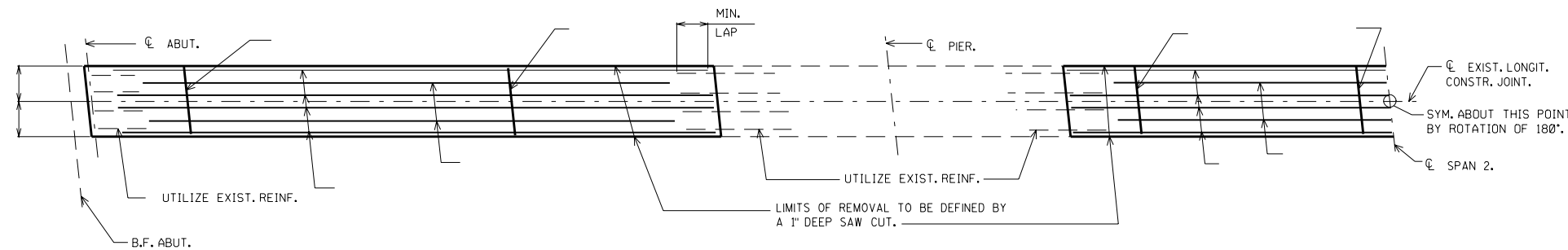
HALF PLAN SHOWING TOP BAR STEEL REINF.



HALF LONGIT. SECTION

TOTAL ESTIMATED QUANTITIES

BID ITEMS	
JOINT REPAIR	S.Y.
COATED HIGH-STRENGTH BAR STEEL REINFORCEMENT, BRIDGES	LB.
CONCRETE MASONRY, BRIDGES	C.Y.
CONCRETE MASONRY, OVERLAY, DECKS	C.Y.

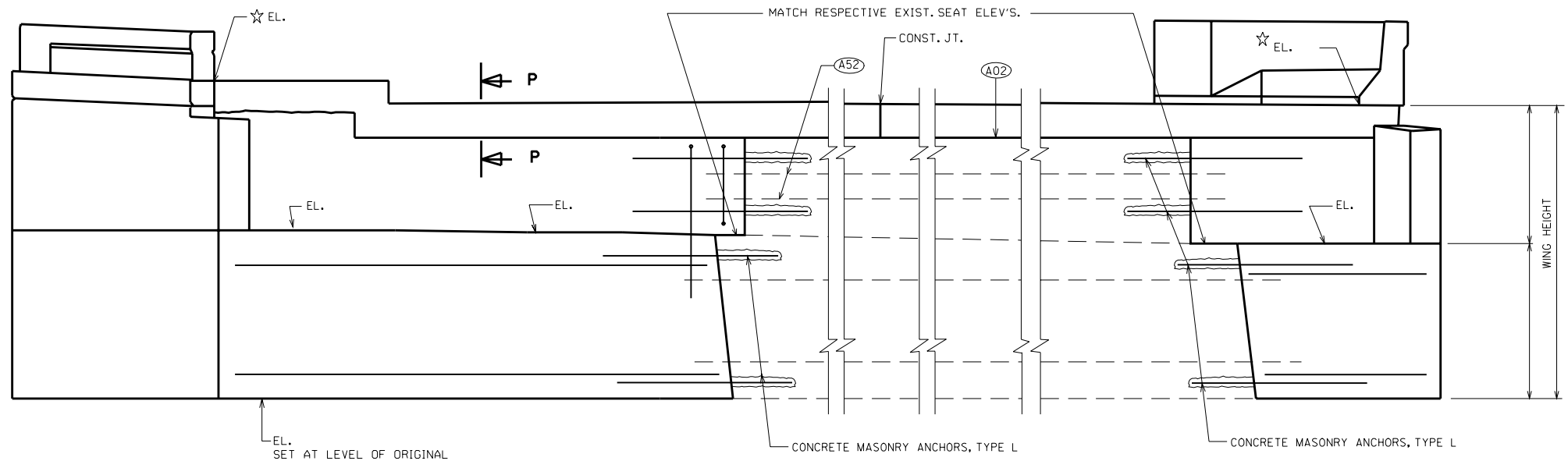


HALF PLAN SHOWING BOTTOM BAR STEEL REINF
(REQUIRED ONLY FOR FULL DEPTH DECK REPAIR)

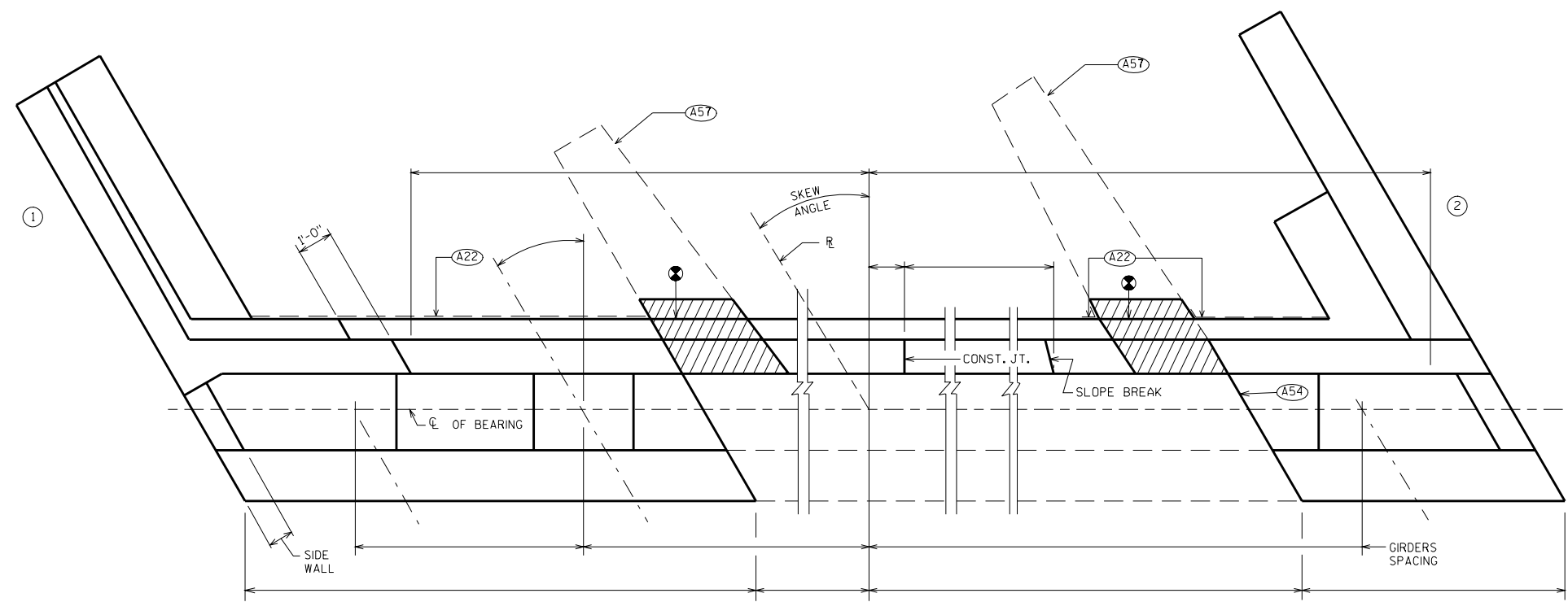
LONGIT. CONST. JOINT REPAIRS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

APPROVED: _____ DATE: 8/99

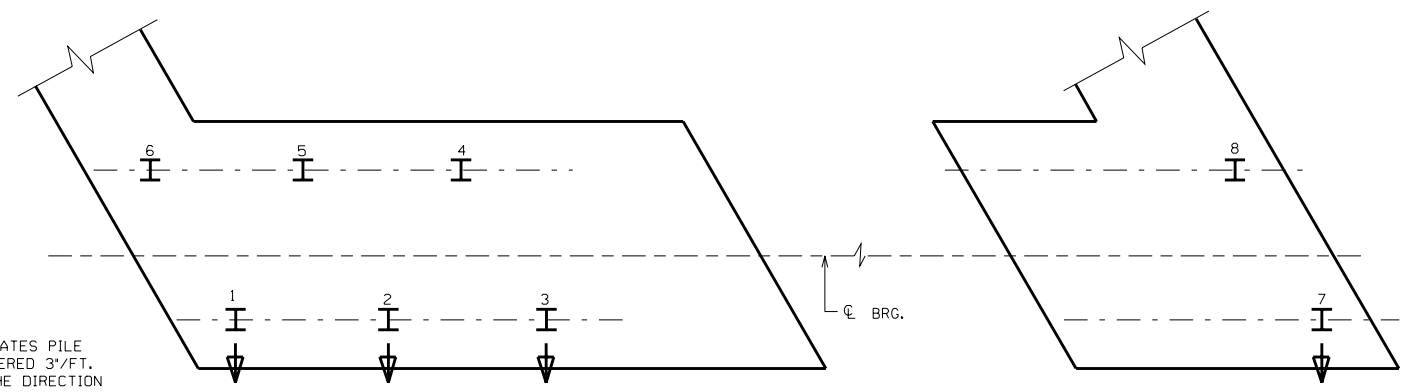


ELEVATION

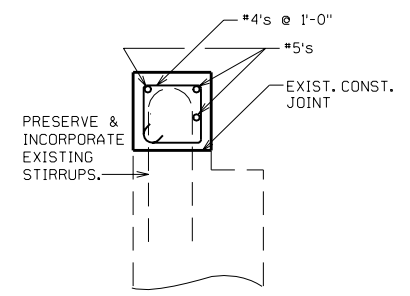


WING WITHOUT PILE

WING WITH PILE



PILE PLAN



SECTION P

I INDICATES PILE BATTERED 3'/FT. IN THE DIRECTION SHOWN.

NOTES

- (A02) CONSTRUCTION JOINT: POUR CONCRETE ABOVE THIS JOINT AFTER SUPERSTRUCTURE CONCRETE IS IN PLACE. STRIKE OFF AND LEAVE ROUGH.
- (A22) 18" (RMW) RUBBERIZED MEMBRANE WATERPROOFING SEAL ALL HORIZ. & VERT. JOINTS AT BACKFACE.
- (A52) SALVAGE EXIST. REINF. & EXTEND FULL LENGTH INTO NEW WORK.
- (A54) ROUGHEN SURFACE OF CONCRETE 1/4" DEEP MIN. ALL AREAS OF NEW TO EXIST. CONCRETE CONTACT.
- (A57) EXIST. WINGS. REMOVE A MIN. OF 2'-0" BELOW FINISHED GRADE.
- ☆ ELEV. @ F.F. ABUT. BACKWALL AND GUTTERLINE.
- ⊗ REMOVE CONC. IN THIS AREA DOWN TO EXIST. BRIDGE SEAT. INCORPORATE EXIST. BAR STEEL INTO NEW WORK.

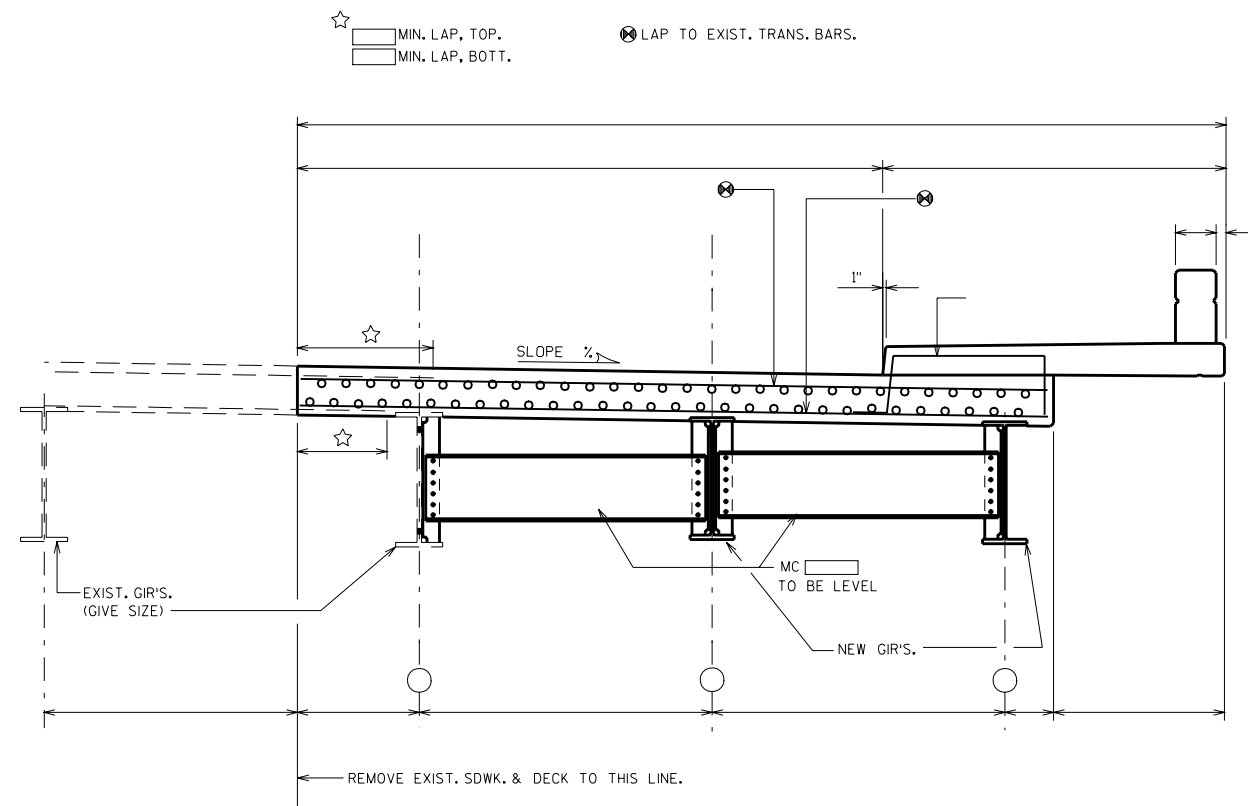
DESIGNER NOTES

SEE CHPT. 12 FOR NEW BAR STEEL PLACEMENT, DETAILS, DIMENSIONS, & NOTES.

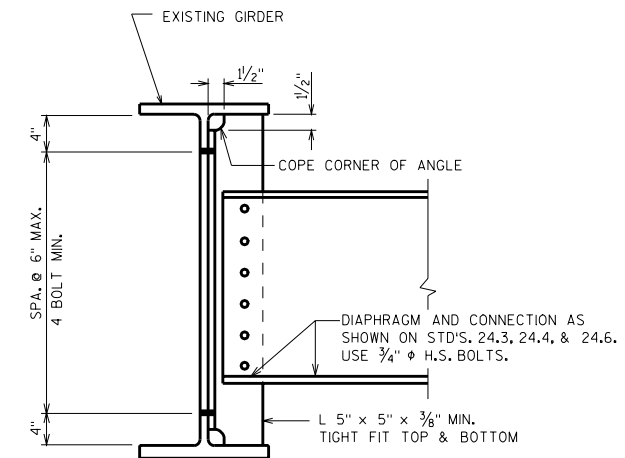
ABUTMENT WIDENING

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

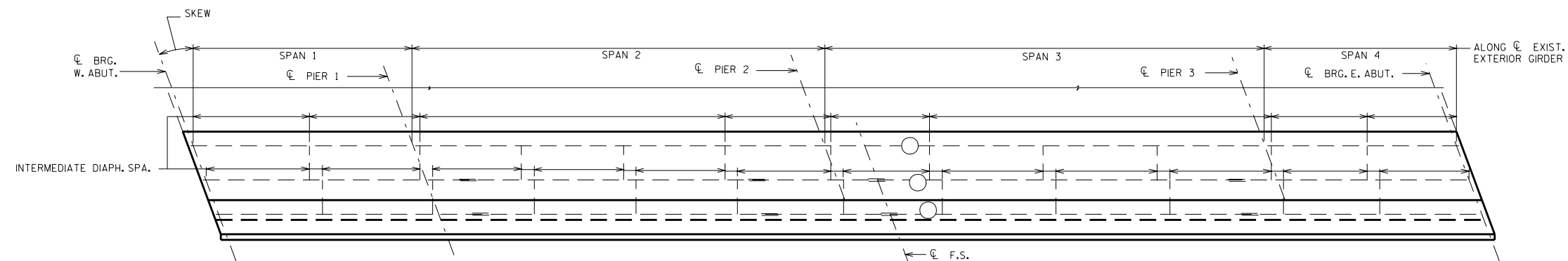
APPROVED: _____ DATE: 12/00



CROSS SECT. THRU RDWY.



DIAPHRAGM CONNECTION TO EXISTING STEEL GIRDER



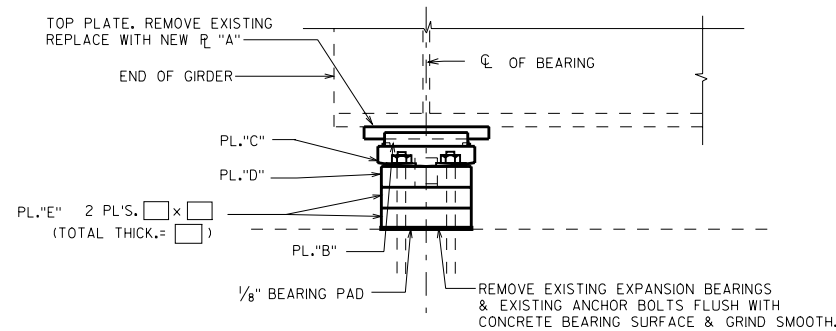
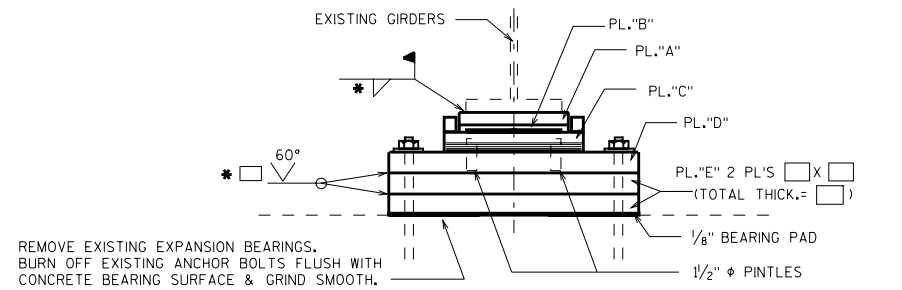
PLAN

SLAB WIDENING

STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION
 STRUCTURES DEVELOPMENT SECTION

APPROVED: _____

DATE:
8/99



EXPANSION BEARING REPLACEMENT - STEEL GIRDERS STEEL BEARINGS

SEE STANDARD 27.1 & 27.8 FOR BEARING DETAILS

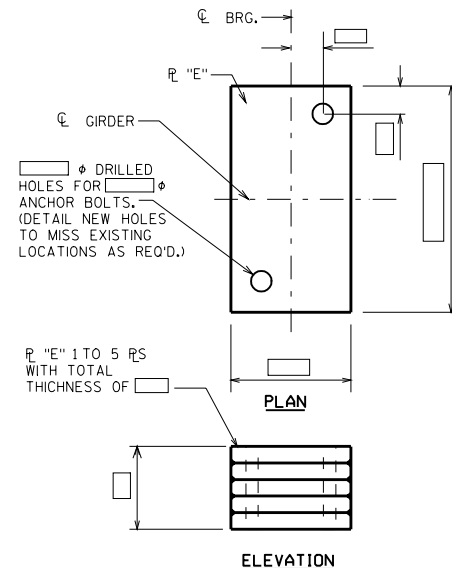
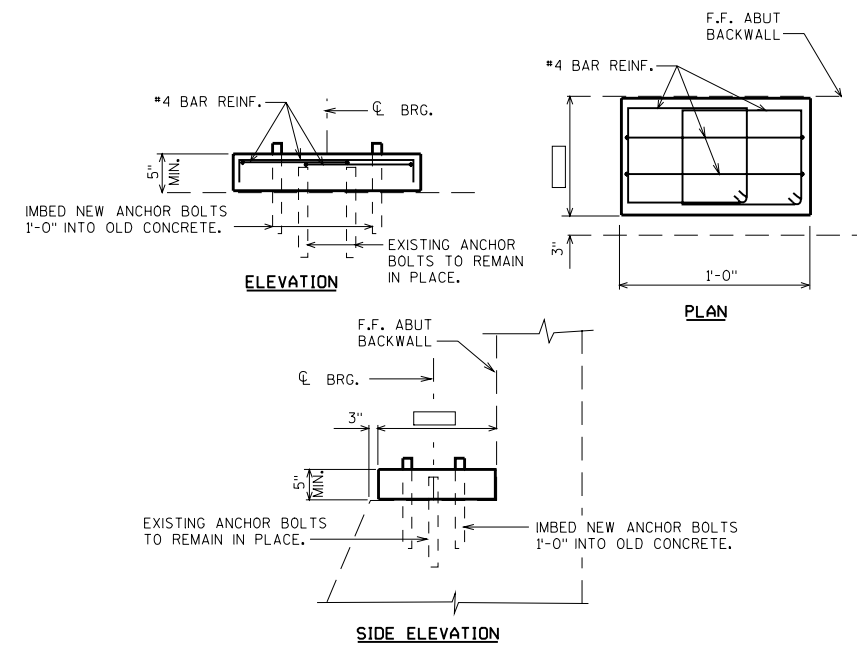
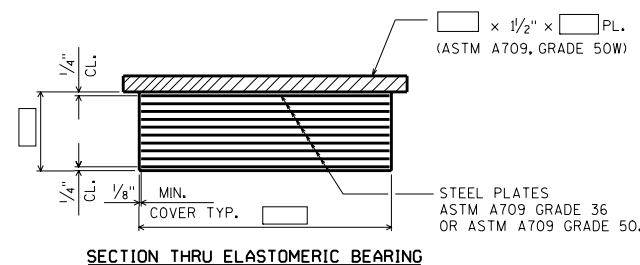
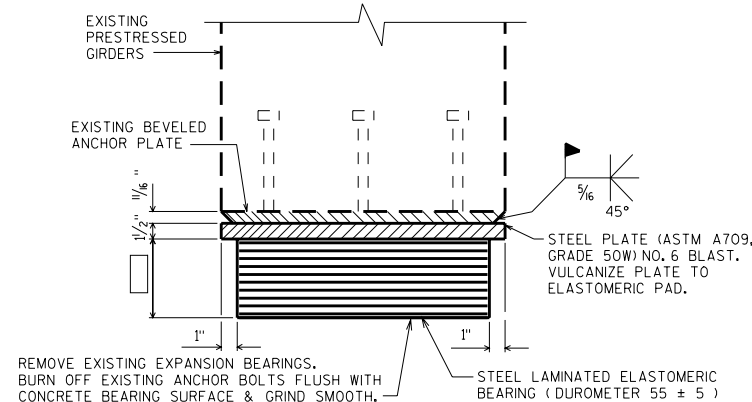


PLATE 'E' DETAILS



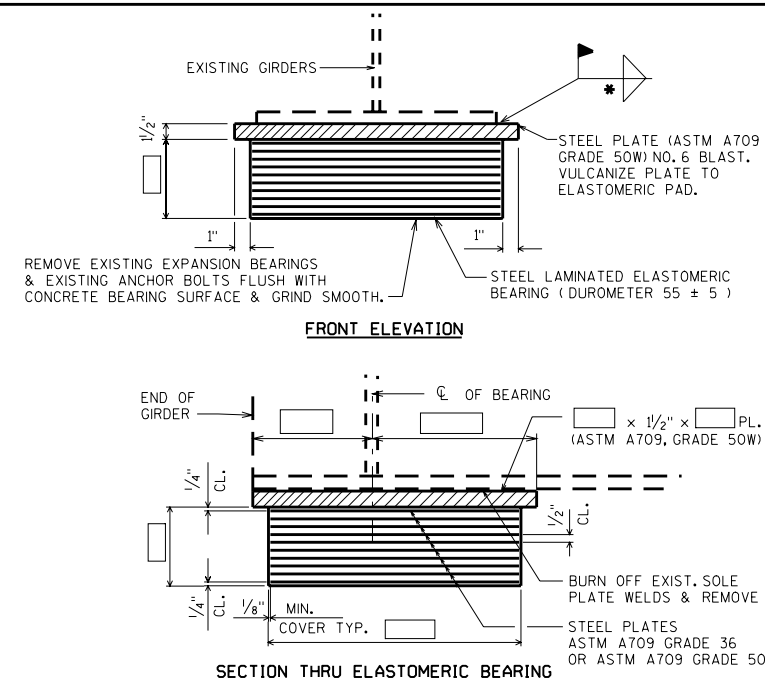
CONCRETE BEARING BLOCK DETAILS

(MAY BE USED IN LIEU OF PLATE 'E')



EXPANSION BEARING REPLACEMENT - PRESTRESSED GIRDERS ELASTOMERIC BEARINGS

- NOTE:
SEE STANDARD 27.7 FOR ADDITIONAL INFORMATION
- ⊗ DUE TO HEIGHT RESTRICTIONS, STEEL PLATE MAY BE OMITTED AND ELASTOMER EPOXYED TO GIRDER. EPOXY TO BE SUPPLIED BY BEARING MANUFACTURER.
- ALL MATERIAL USED FOR BEARINGS SHALL BE PAID AT THE UNIT PRICE BID FOR "LAMINATED ELASTOMERIC BEARING PADS."
- GRIND EXIST. WELD THAT ATTACHED EXIST. TOP PLATE TO EXIST. BOT. FLANGE. GRIND AFFECTED AREAS SMOOTH.



EXPANSION BEARING REPLACEMENT - STEEL GIRDERS ELASTOMERIC BEARINGS

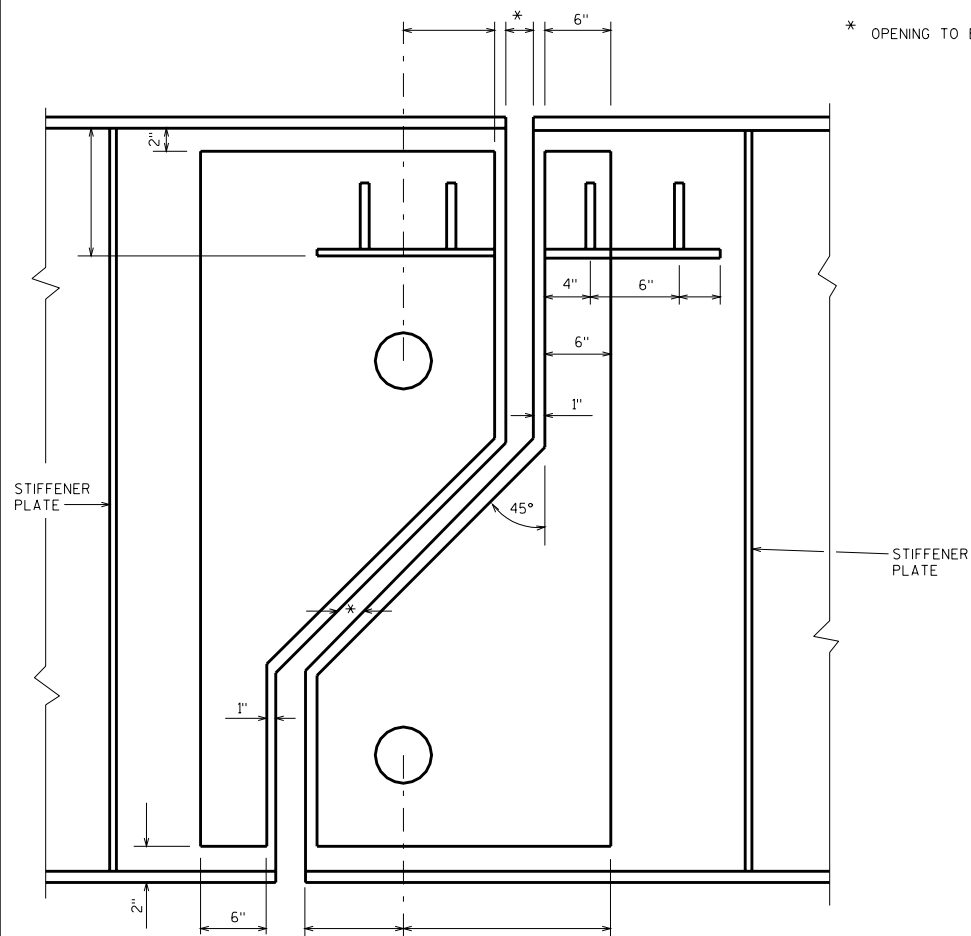
NOTE:
SEE STANDARD 27.7 FOR ADDITIONAL INFORMATION.

EXPANSION BEARING REPLACEMENT DETAILS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DEVELOPMENT SECTION

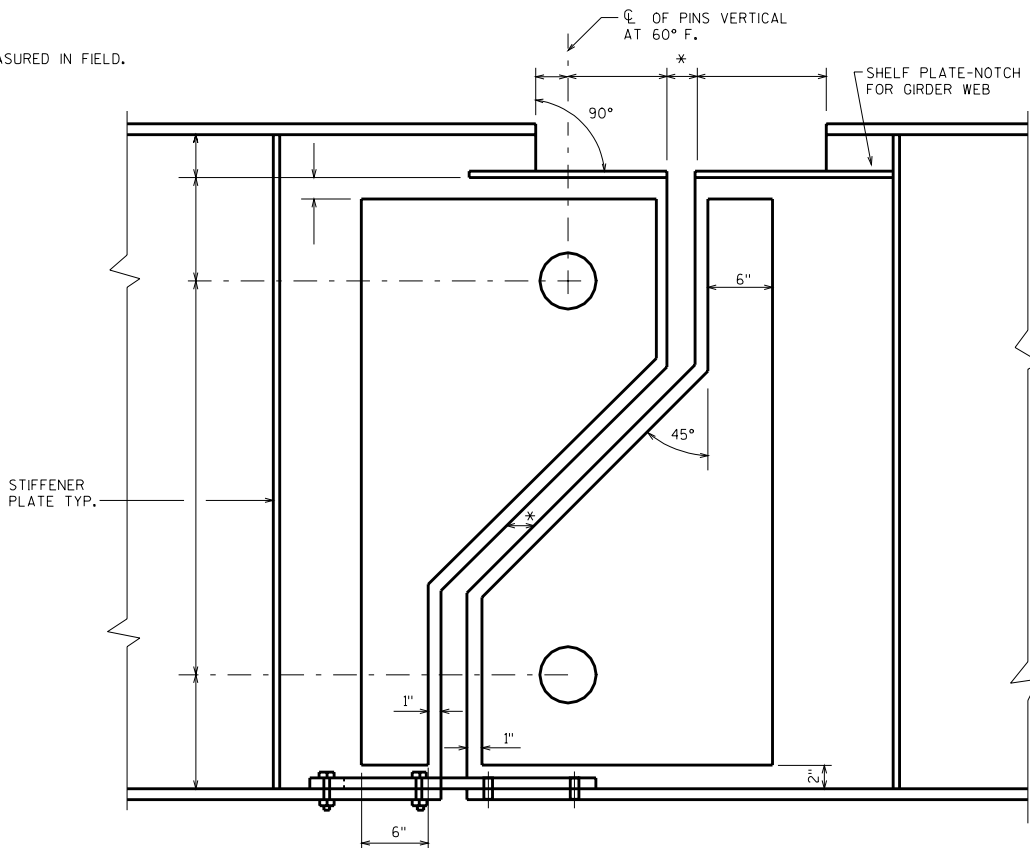
APPROVED: _____

DATE:
8/99



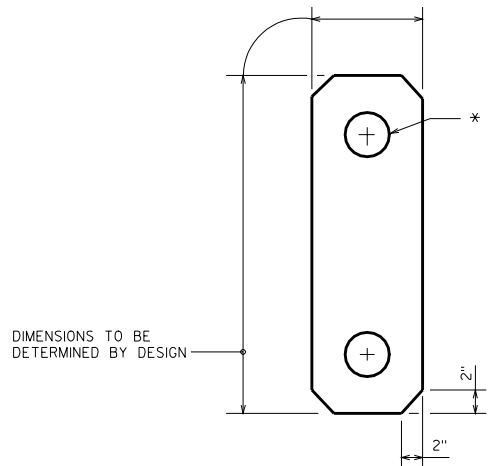
TYPICAL HINGE DETAIL FOR WATERTIGHT EXPANSION DEVICE

NOTE:
DETAILS NOT SHOWN ARE IDENTICAL TO DETAILS SHOWN
FOR "FINGER TYPE EXPANSION DEVICE".

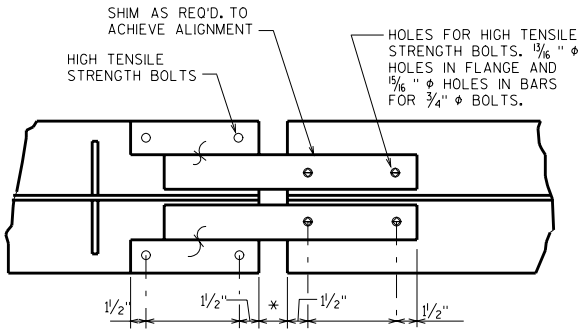


TYPICAL HINGE DETAIL FOR FINGER TYPE EXPANSION DEVICE

(HANGER PLATES NOT SHOWN)

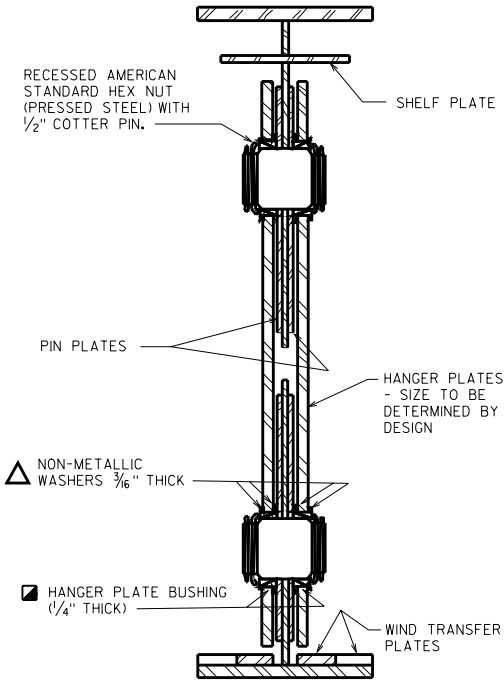


HANGER PLATE DETAIL



TYPICAL WIND TRANSFER PLATES DETAIL

CONTACT AREA OF WIND TRANSFER
PLATES TO BE FINISHED ANSI 125.



SECTION THRU HINGE

NOTES

INSIDE HOLES OF HANGER PLATES SHALL BE COATED WITH "BLOXIDE" OR AN APPROVED EQUAL AFTER FINISHING. THE BUSHINGS SHALL HAVE A PRESS FIT INTO HANGER PLATES. THE INSIDE DIAMETER OF THE BUSHING SHALL PROVIDE A CLEARANCE OF 0.005" MINIMUM AND 0.010" MAXIMUM OVER THE FINISHED DIAMETER OF THE PIN. NOTE THAT THE HOLE DIAMETER SHALL BE SMALLER THAN THE BUSHING O.D. BY AT LEAST 0.001". FINISH ANSI125.

ALL DIMENSIONS ARE TO BE FIELD VERIFIED BY THE CONTRACTOR.

REMOVE EXISTING HANGER PLATES, PINS, AND WIND TRANSFER PLATES AND REPLACE WITH NEW MATERIALS.

BID ITEM SHALL BE "HINGE REPLACEMENT", EACH. ALL MATERIAL AND WORK INVOLVED SHALL BE PAID FOR UNDER "HINGE REPLACEMENT".

NEW PINS SHALL BE 1/4" LARGER IN DIAMETER THAN EXISTING PINS. BORE OUT EXISTING PIN HOLES TO A DIAMETER EQUAL TO NEW PIN DIAMETER PLUS 0.005" TO 0.010". FINISH ANSI125. GREASE INSIDE SURFACE OF HOLE. BORING PROCEDURE TO BE APPROVED BY ENGINEER.

BLAST CLEAN GIRDER WEB AND FLANGES WITHIN 2'-0" OF \bar{C} OF HINGE IN ACCORDANCE WITH THE STEEL STRUCTURES PAINTING COUNCIL'S SPECIFICATION SSPC-SP6. PAINT AREA CLEANED WITH ORGANIC ZINC RICH PAINT SYSTEM.

HANGER PLATES AND WIND TRANSFER PLATES SHALL BE SHOP PAINTED.

BUSHINGS SHALL BE THE SAME LENGTH AS THE HANGER PLATE THICKNESS.

NON-METALLIC WASHERS SHALL HAVE AN INSIDE DIAMETER OF BETWEEN 0.005" AND 0.010" LARGER THAN THE PIN DIAMETER.

PIN MATERIAL SHALL BE DETERMINED FROM THE ALLOWABLE STRESSES GIVEN IN AASHTO, "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", TABLE 10.32.4.3A. PINS SHALL CONFORM TO ONE OF THE FOLLOWING:

- ASTM A108 GRADES 1016 THROUGH 1030
- ASTM A668 CLASS C
- ASTM A668 CLASS D
- ASTM A668 CLASS F
- PINS TO BE FINISHED ANSI63.

■ BUSHINGS SHALL BE GAR-MAX AS MANUFACTURED BY GARLOCK BEARINGS, INC. OR DURALON JOURNAL BEARINGS AS MANUFACTURED BY REXNORD BEARING DIVISION, OR APPROVED EQUALS. BUSHINGS SHALL HAVE A NOMINAL WALL THICKNESS OF 1/4".

△ NON-METALLIC WASHERS REQUIRED FOR USE AS SPACERS BETWEEN THE PIN PLATES AND THE HANGER PLATES AND THE HANGER PLATES AND NUTS SHALL BE MADE FROM ONE OF THE FOLLOWING MATERIALS:

1. PHENOLIC, CANVAS REINFORCED, MIL-P-15035
2. POLYETHYLENE, HIGH DENSITY, BLACK ASTM D 1248, TYPE III, CLASS B
3. ACETAL, FEDERAL SPECIFICATION L-P-392
4. TEFLON TFE, MIL-P-22241A

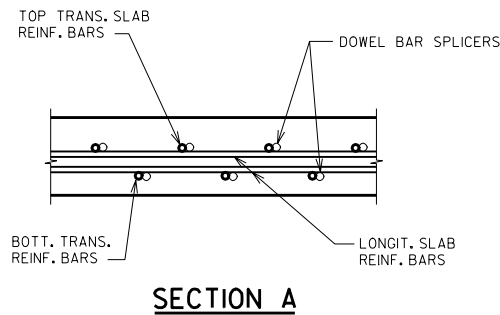
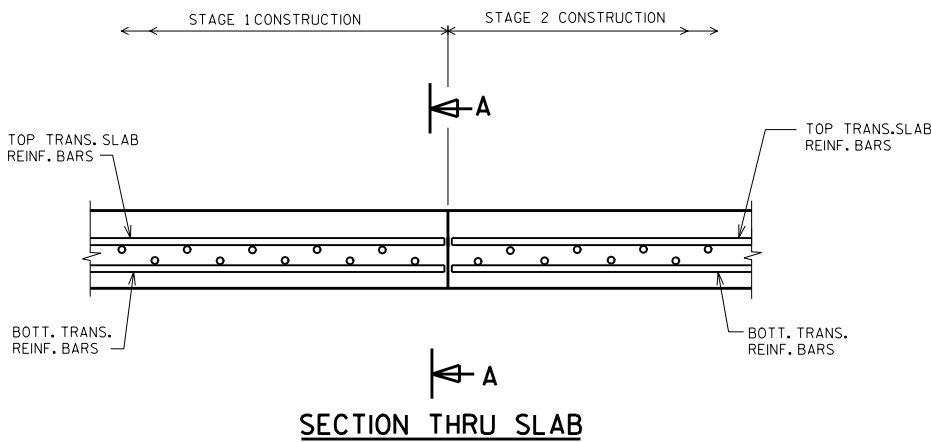
HINGED JOINT REHABILITATION

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NOTES

STEEL SPLICE (COUPLER) ASSEMBLY SHALL BE AN APPROVED TYPE AND SHALL DEVELOP IN TENSION AT LEAST 125% OF THE YIELD STRENGTH OF THE SPLICED REINFORCEMENT BARS.

DOWEL BAR SPLICERS SHALL BE OF MINIMUM 60 KSI YIELD STRENGTH, AND HAVE TENSILE STRENGTH AREA EQUAL OR GREATER THAN THAT OF THE LAPPED REINFORCEMENT BARS.

DOWEL BAR SPLICERS SHALL MEET THE DEFORMATION REQUIREMENTS FOR STANDARD ASTM DEFORMED REINFORCING BARS.

FOR DOWEL BAR SPLICERS, ALL REINFORCEMENT BARS SHALL BE LAPPED AND TIED TO THE SPLICER BARS.

SPLICER (COUPLER) ASSEMBLY IN THE SLAB SHALL BE EPOXY COATED IN ACCORDANCE WITH THE REQUIREMENTS FOR REINFORCEMENT BARS.

OTHER SYSTEMS OF SIMILAR DESIGN MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL. APPROVAL SHALL BE BASED ON CERTIFIED TEST RESULTS FROM AN APPROVED TESTING LABORATORY THAT THE PROPOSED SPLICER (COUPLER) ASSEMBLY SATISFIES THE FOLLOWING REQUIREMENT:

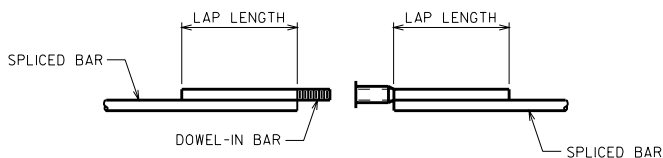
① MINIMUM CAPACITY = $1.25 \times f_y \times \text{AREA OF SPLICED REINFORCEMENT BAR}$

WHERE f_y = YIELD STRENGTH OF SPLICED REINFORCEMENT BARS

DOWEL BAR SPLICER LAP LENGTHS

CONCRETE UNDER BAR	BAR SIZE	4	5	6	7	8	9	10	11
12" OR LESS	f'c = 3500	1'-8"	2'-8"	3'-2"	4'-3"	5'-6"	7'-0"	8'-9"	10'-11"
	f'c = 4000	1'-8"	2'-8"	3'-2"	4'-0"	5'-2"	6'-6"	8'-3"	10'-2"
MORE THAN 12"	f'c = 3500	2'-3"	2'-11"	3'-6"	4'-8"	6'-1"	7'-10"	9'-10"	12'-1"
	f'c = 4000	2'-3"	2'-11"	3'-6"	4'-5"	5'-8"	7'-4"	9'-2"	11'-4"

BAR LENGTH COMPUTED TO ϕ LONGIT. JOINT AND SHALL BE MODIFIED IF REQ'D. TO BAR COUPLER MANUFACTURER RECOMMENDATIONS. PAY BASED ON BARS AS DETAILED.

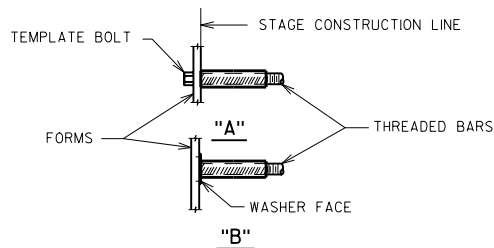
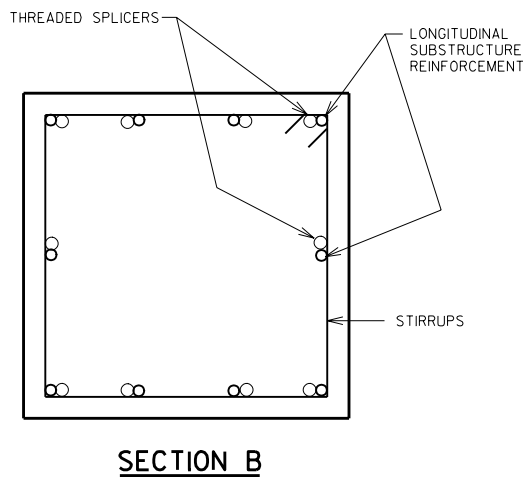
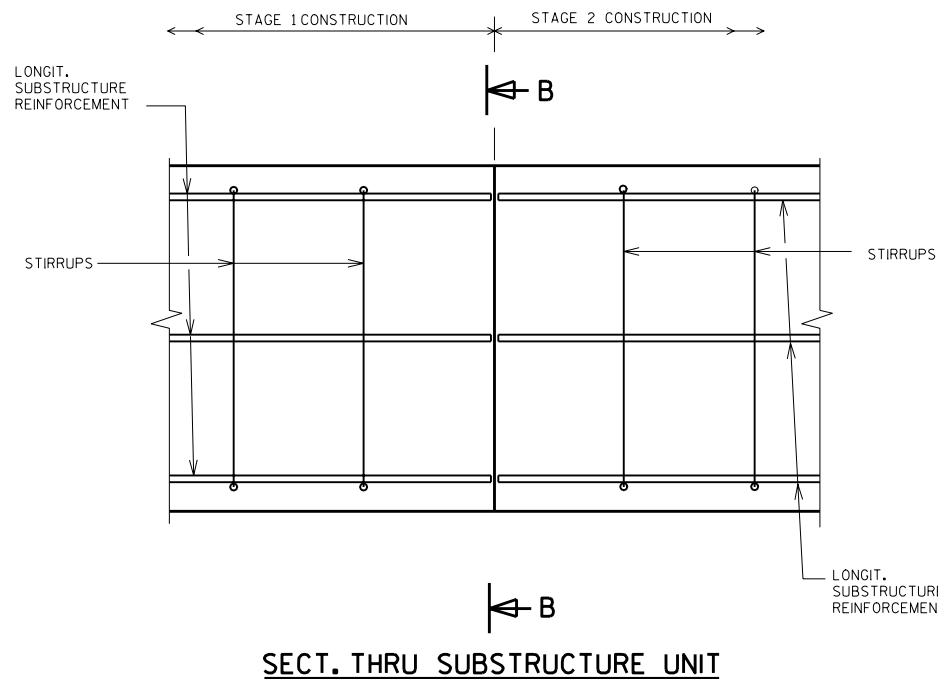


DOWEL BAR SPLICER



ONE PIECE THREADED SPLICER

SPLICER ALTERNATIVES



INSTALLATION AND SETTING METHODS

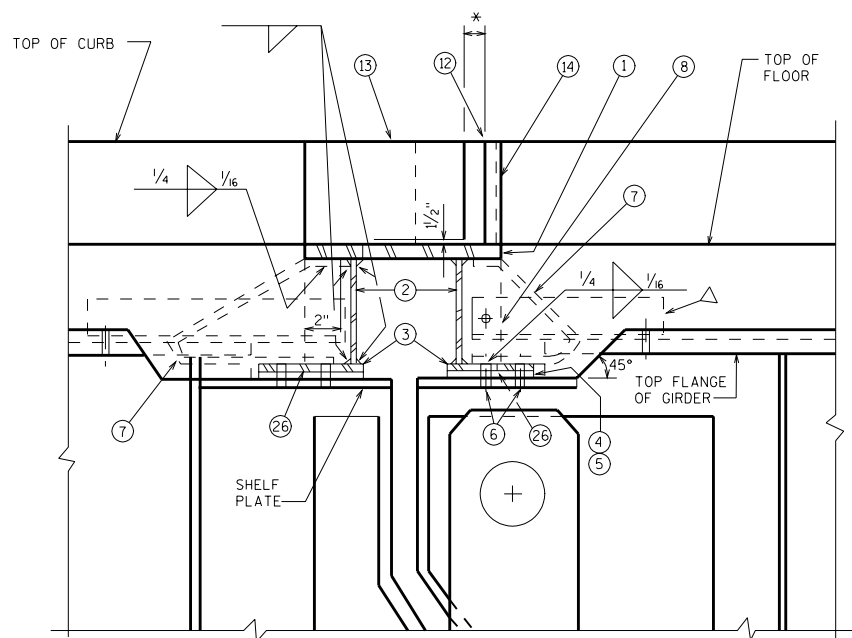
"A" SET SPLICER BY MEANS OF A TEMPLATE BOLT
 "B" SET SPLICER BY NAILING TO WOOD FORMS OR CEMENTING TO STEEL FORMS.

BAR SPLICER (COUPLER) DETAILS AT STAGE CONSTRUCTION

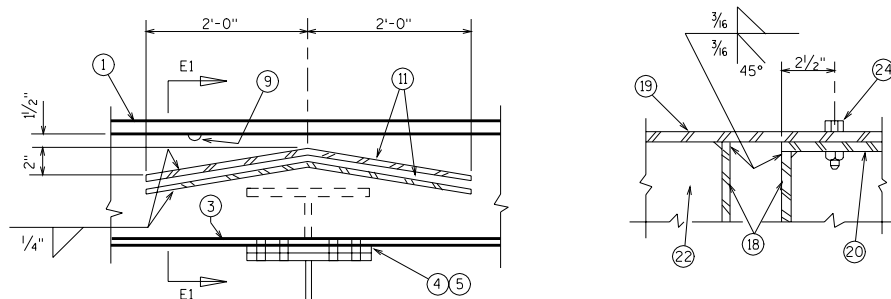
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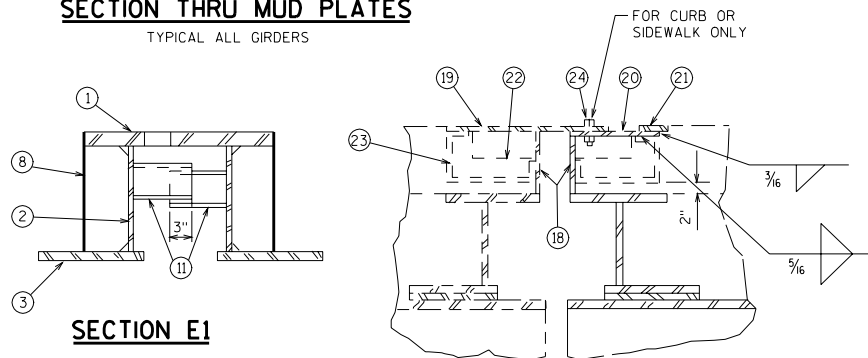
DATE:
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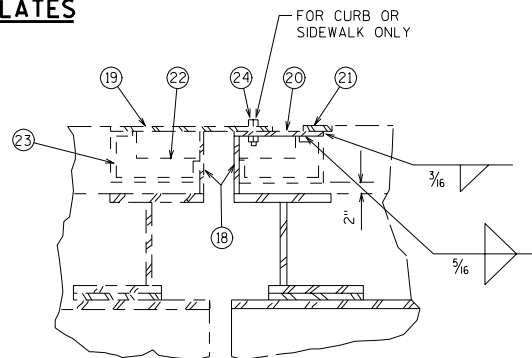
SECTION THRU JOINT
MUD PLATES NOT SHOWN



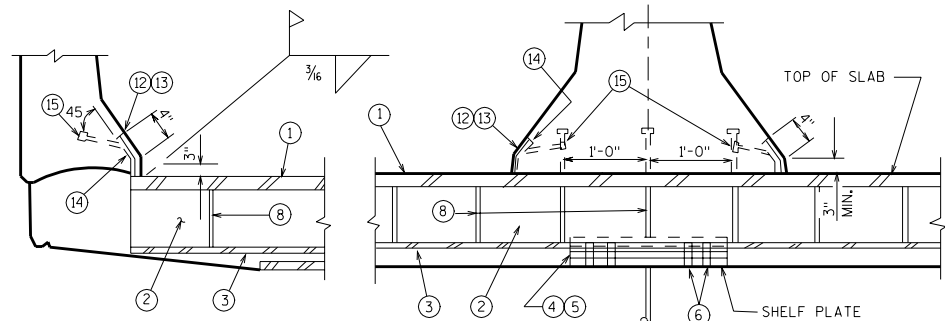
SECTION THRU MUD PLATES
TYPICAL ALL GIRDERS



SECTION E1

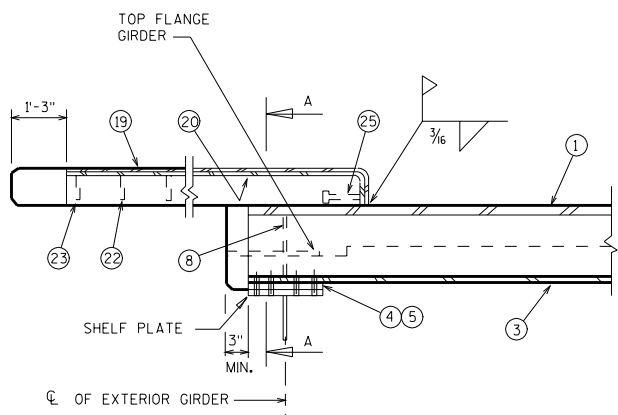


SECTION A-A

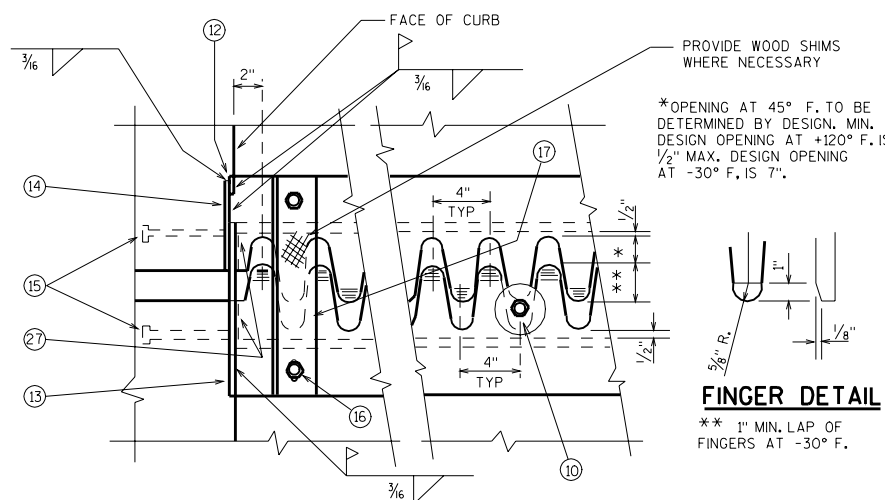


DETAIL AT PARAPET

DETAIL AT MEDIAN



SECTION THRU SIDEWALK

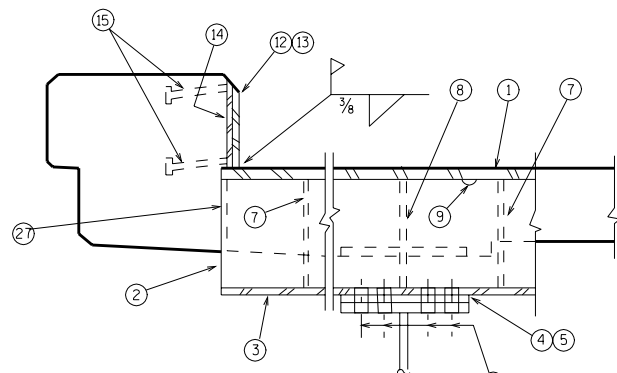


PART PLAN OF FINGER PLATE AT BRUSH CURB

NO SKEW

FINGER DETAIL

** 1" MIN. LAP OF FINGERS AT -30° F.



SECTION THRU JOINT AT BRUSH CURB

MUD PLATES NOT SHOWN
△ ANGLE 3 1/2" x 3 1/2" x 3/16" FIELD DRILL 3/4" φ ERECTION BOLT HOLES OR WELD TO STIFFENER OR TOP FLG.

LEGEND

1. FINGER PLATE. SIZE TO BE DETERMINED BY DESIGN.
2. WEB PLATE. SIZE TO BE DETERMINED BY DESIGN.
3. FLANGE PLATE. SIZE TO BE DETERMINED BY DESIGN.
4. BEVELED SHIM PLATE 3/16" THICK. 5/16" φ HOLES FOR NO. 6.
5. 3/4" LAMINATED SHIM WITH SLOTTED OPENINGS
6. 3/4" φ ERECTION BOLTS. DRILL HOLES IN SHELF PLATE IN THE FIELD.
7. ANCHOR BAR 5/8" φ AT 1'-0" CENTERS. BEND AS SHOWN.
8. STIFFENER BAR 3/8" THICK. 1/4" FILLET WELD ALL AROUND. PLACE AT CL OF GIRDER AND AT +2'-0" CENTERS BETWEEN GIRDERS.
9. 7/8" VENT HOLES AT 3'-0" CENTERS.
10. 3/4" φ ADJUSTING BOLT AT APPROX. 4'-0" CENTERS WITH TWO 3/16" φ X 3/8" PLATE WASHERS. ONE ON EACH SIDE OF FINGER PLATE.
11. MUD PLATE 1/4" THICK
12. 3/8" PLATE. BEND AS SHOWN.
13. 3/8" PLATE BEND AS SHOWN.
14. 3/8" PLATE BEND AS SHOWN.
15. 5/8" φ STUDS X 6 5/16" LONG. WELD TO PLATES NO. 13 AND NO. 14.
16. 3/4" φ BOLT FOR SHIPPING. TACK WELD NUT TO BOTTOM OF PLATE NO. 1.
17. 3" φ X 3" φ X 1/4" + 5'-0" SPACING. SLOTTED HOLE 7/8" X 2 3/8" IN ONE END OF ANGLE AS SHOWN. FOR BOLT NO. 16.
18. CLOSING PLATE 3/8" CUT AS SHOWN. SEE WELD DETAIL
19. 3/8" PLATE. BEND AS SHOWN.
20. 3/8" PLATE. BEND AS SHOWN.
21. 3/8" PLATE. BEND AS SHOWN.
22. 3/8" PLATE. WELD ALL AROUND. 1/4" FILLET WELD TO PLATES NO. 18, 19, & 20.
23. 5/8" φ STUDS X 6 5/16" LONG. BEND AFTER WELD.
24. 3/4" φ BOLT WITH SO. NUT. GREASE FOR EASY REMOVAL. 7/8" X 1 3/4" SLOTTED HOLE IN PL. NO. 19. LONG DIMENSION OF HOLE PARALLEL TO CL OF ROADWAY. TACK WELD NUT TO PLATE NO. 20 + 2'-0" SPA.
25. 5/8" φ STUDS X 6 5/16" LONG. WELD TO PLATE NO. 20.
26. FLANGE PLATE. SAME THICKNESS AS PLATE NO. 3 AND SAME WIDTH AS SHELF PLATE. SHOP BUTT WELD TO PLATE NO. 3.
27. 3/8" CLOSING PLATE. WELD TO PLATES NO. 1 AND NO. 2.

NOTES

REMOVE ANGLE NO. 17 AND ADJUSTING BOLT NO. 10 AFTER VERTICAL AND HORIZONTAL ALIGNMENT IS SECURE IN FIELD. FILL HOLES WITH HOT POURED JOINT SEALER.

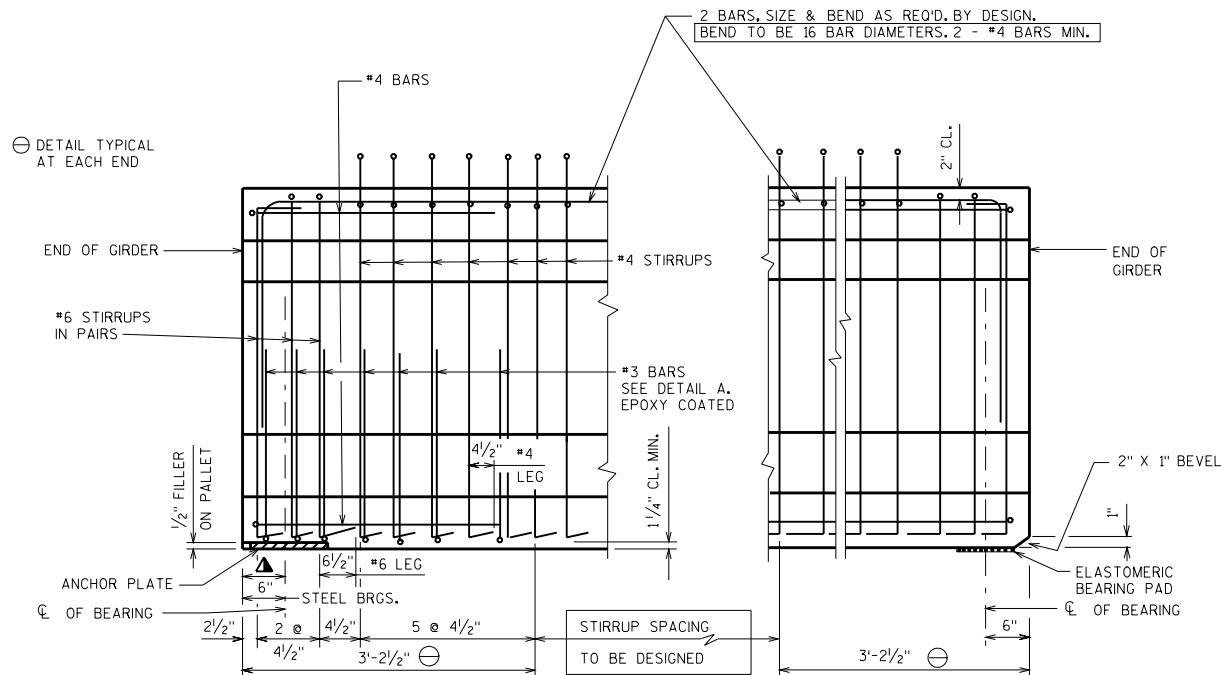
IN SOME CASES THE GIRDER FLANGES AND WEB PLATES DO NOT HAVE TO BE CUT TO ACCOMMODATE THE FINGER JOINT SECTION, THE SLAB DEPTH MAY BE UTILIZED EFFECTIVELY.

FINGER TYPE EXPANSION JOINT - PLATE GIRDER

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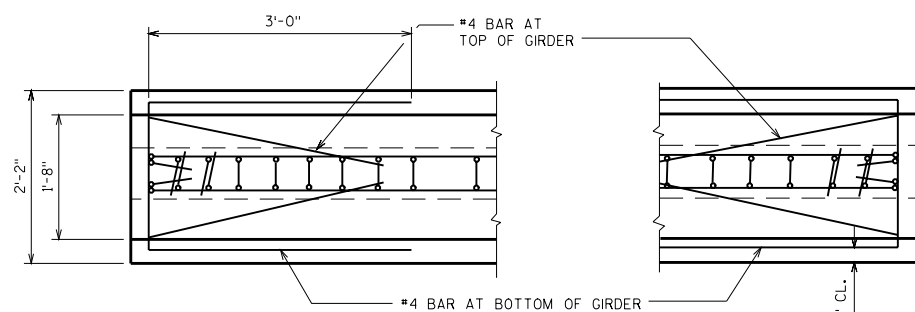
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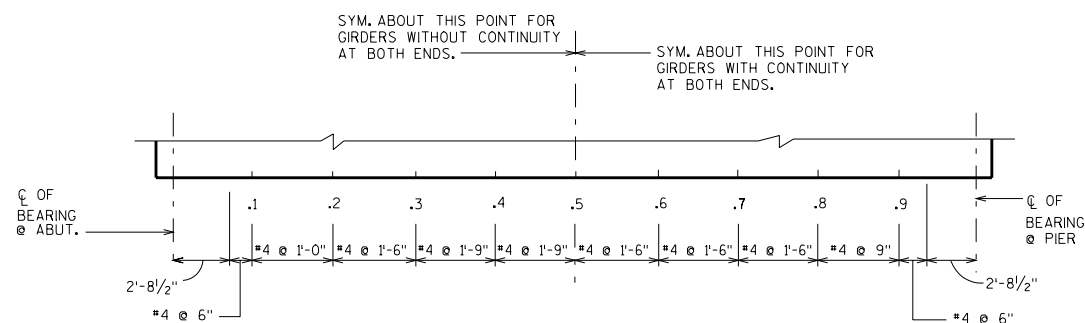
SUPPORT WITH STEEL OR ELASTOMERIC BRGS.

SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD

SIDE VIEW OF GIRDER

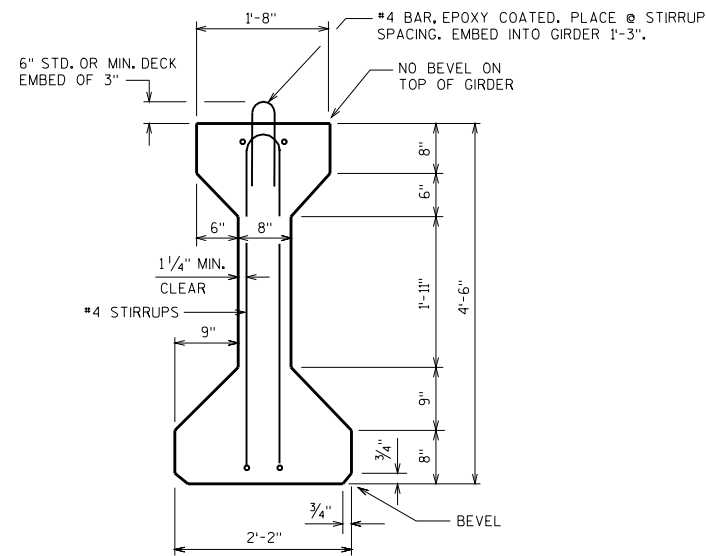


TOP VIEW OF GIRDER

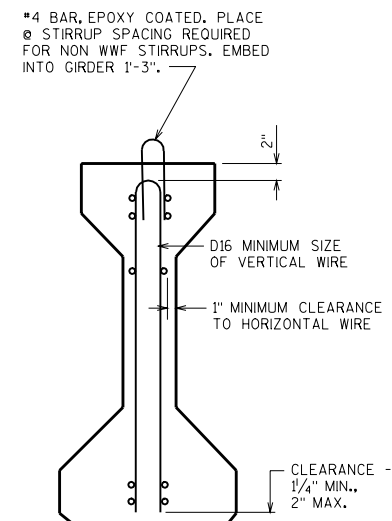


MAXIMUM STIRRUP NUMBER REQUIREMENTS

VALUES SHOWN ARE FOR STIRRUPS FOR 85'-0" SPANS AND 12'-11" GIRDER SPACING, HS20 LOADING. DESIGN STIRRUPS FOR ALL OTHER CASES. USE #4 BARS AT 1'-9" AS MINIMUM STIRRUP AREA.



SECTION THRU GIRDER



SECTION THRU GIRDER

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS

GENERAL NOTES

THESE NOTES APPLY TO ALL GIRDERS.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS. ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. ENDS OF STRANDS SHALL BE PAINTED WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. THIS APPLIES ONLY TO THOSE ENDS OF GIRDERS THAT ARE FINALLY EXPOSED.

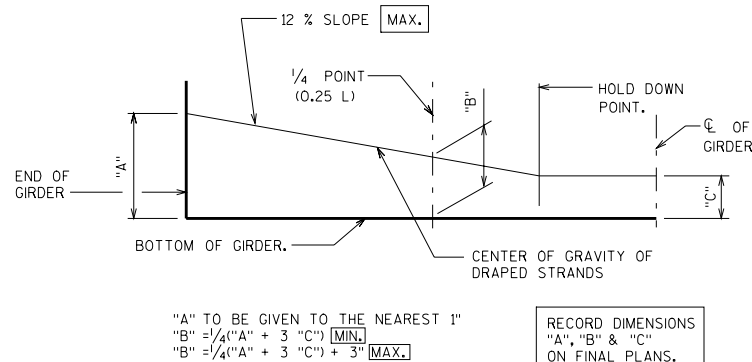
TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BONDING TO THE SLAB, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL BE TROWEL FINISHED.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. IF THE FABRICATOR WANTS TO BUILD A BAR STEEL CAGE BY WELDING LONGITUDINAL REINFORCEMENT TO THE #4 STIRRUPS, TWO OPTIONS ARE AVAILABLE:

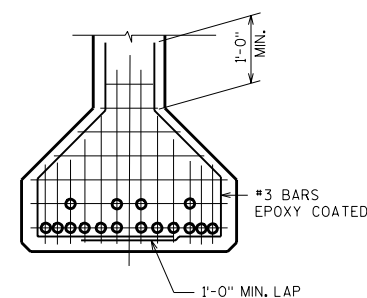
1. USE ASTM A706, GRADE 60 REINFORCEMENT AND THE STIRRUP SPACING AS SHOWN ON THE PLANS.
2. USE ASTM A615, GRADE 40 REINFORCEMENT AND A MODIFIED STIRRUP SPACING SUBMITTED TO AND APPROVED BY THE STRUCTURES DEVELOPMENT SECTION.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A497.



LOCATION OF DRAPED STRANDS



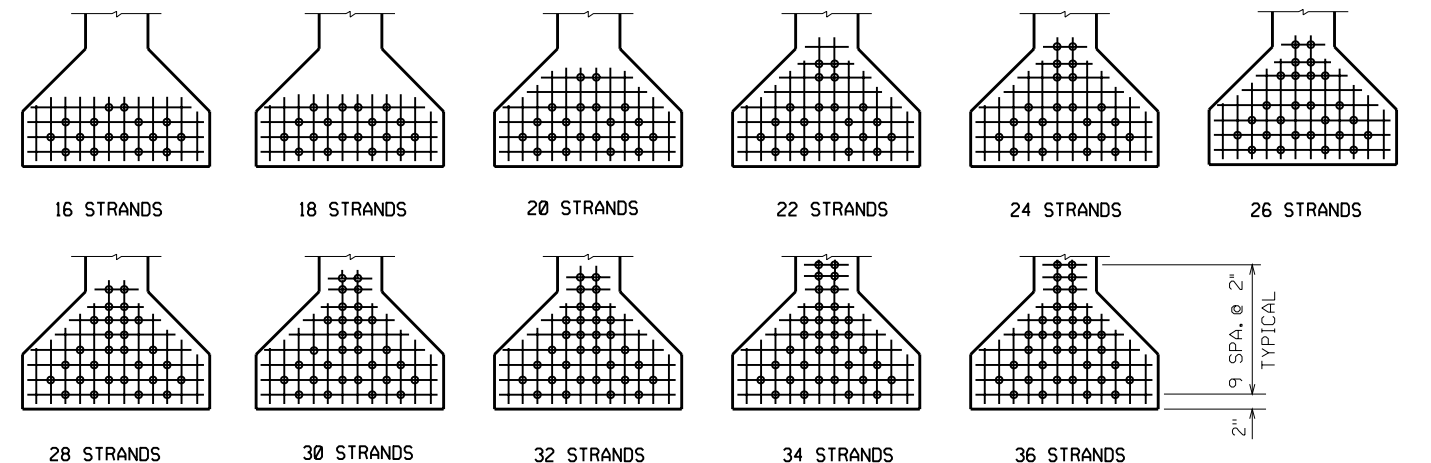
DETAIL A

54" PRETENSIONED GIRDER DETAILS

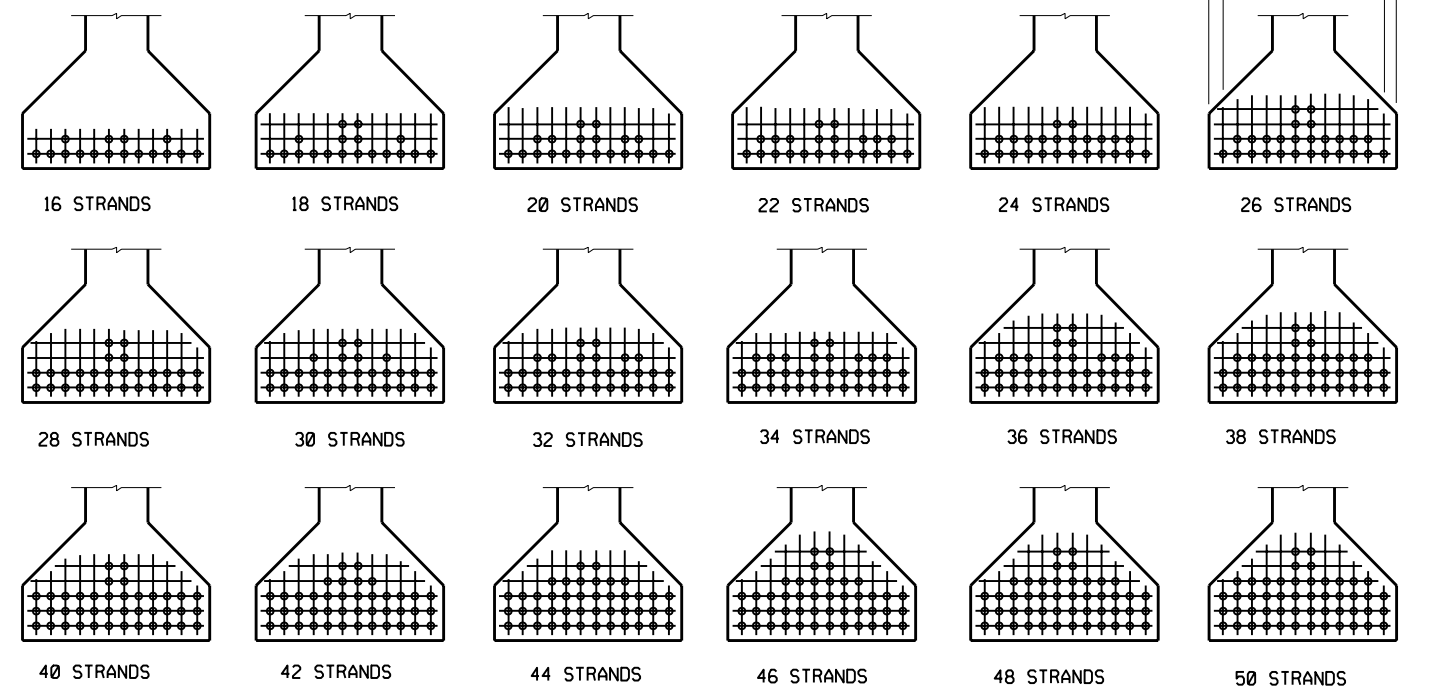
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STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY
TO AVOID DRAPING OF STRANDS



ARRANGEMENT AT $\frac{1}{4}$ SPAN - FOR GIRDERS WITH DRAPED STRANDS

54" GIRDER

$$A = 789 \text{ SQ. IN.}$$

$$r^2 = 330.46 \text{ IN.}^2$$

$$y_T = 29.27 \text{ IN.}$$

$$y_B = 24.73 \text{ IN.}$$

$$I = 260,730 \text{ IN.}^4$$

$$S_T = 8,908 \text{ IN.}^3$$

$$S_B = 10,543 \text{ IN.}^3$$

$$\text{WT.} = 822 \text{ \#/FT.}$$

PRE-TENSION

$$f'_s = 270,000 \text{ P.S.I.}$$

$$f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$$

for low relaxation strands

$$\text{Pi PER } \frac{1}{2}" \phi \text{ STRAND} = 0.1531 \times 202,500 = \underline{31.00 \text{ KIPS}}$$

$$\frac{y_B}{r^2} = \frac{24.73}{330.46} = 0.07484 \text{ IN./IN.}^2$$

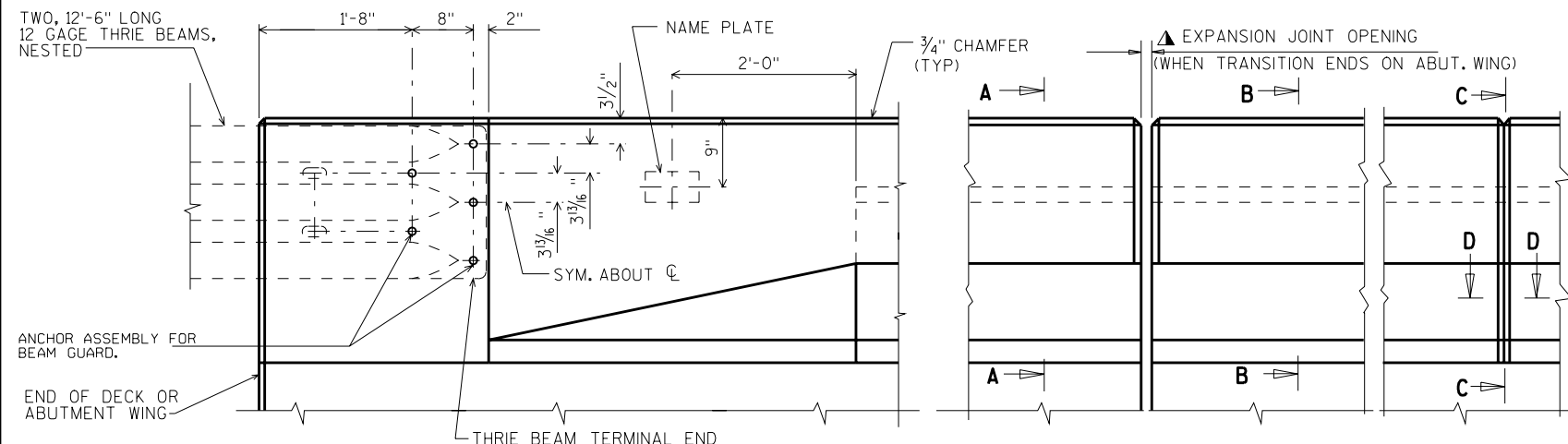
(COMPRESSION IS NEGATIVE)

N NO. STRANDS	(1) e_s (inches)	(2) $(1 + \frac{e_s y_B}{r^2})$	(3) $(A/(2))$ (sq. in.)	(4) $P(\text{init.}) = A_s f_s$ (KIPS)	(5) $f_B (\text{init.}) = \frac{(4)}{(3)}$ (K/Sq. In.)
STANDARD PATTERNS FOR UNDRAPED STRANDS					
16	20.23	2.513	313.85	496	-1.580
18	19.84	2.484	317.54	558	-1.757
20	19.13	2.431	324.48	620	-1.911
22	18.37	2.374	332.25	682	-2.053
24	17.55	2.313	341.06	744	-2.181
26	17.18	2.285	345.19	806	-2.335
28	17.02	2.273	347.01	868	-2.501
30	16.33	2.222	355.07	930	-2.619
32	16.23	2.214	356.27	992	-2.784
34	15.54	2.162	364.78	1054	-2.889
36	15.50	2.159	365.28	1116	-3.055
STANDARD PATTERNS FOR DRAPED STRANDS					
16	22.23	2.663	296.22	496	-1.674
18	21.84	2.634	299.50	558	-1.863
20	21.73	2.626	300.44	620	-2.064
22	21.64	2.619	301.21	682	-2.264
24	21.57	2.614	301.81	744	-2.465
26	21.19	2.585	305.13	806	-2.641
28	21.16	2.583	305.40	868	-2.842
30	20.99	2.570	306.91	930	-3.030
32	20.85	2.560	308.16	992	-3.219
34	20.73	2.551	309.25	1054	-3.408
36	20.39	2.525	312.36	1116	-3.573
38	20.31	2.519	313.11	1178	-3.762
40	20.23	2.514	313.85	1240	-3.951
42	20.06	2.501	315.45	1302	-4.127
44	19.91	2.490	316.87	1364	-4.305
46	19.60	2.467	319.85	1426	-4.458
48	19.48	2.458	321.02	1488	-4.635
50	19.37	2.450	322.10	1550	-4.812
52	19.19	2.436	323.88	1612	-4.977
54	19.03	2.424	325.48	1674	-5.143

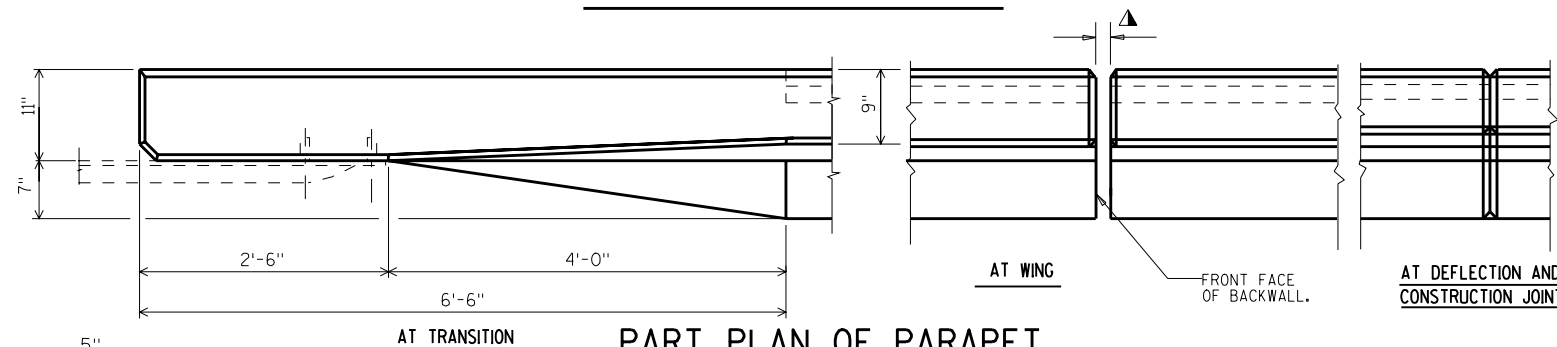
54" PRETENSIONED GIRDER DESIGN DATA

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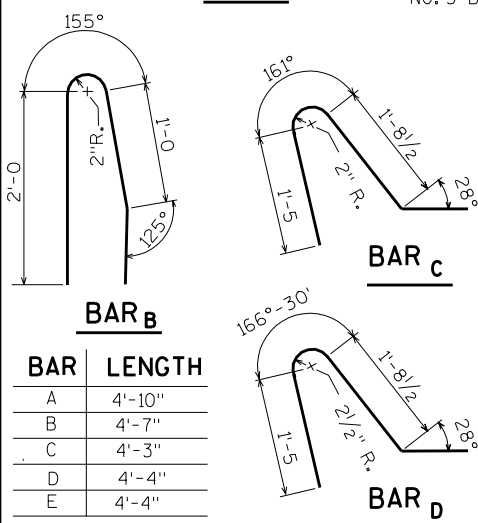
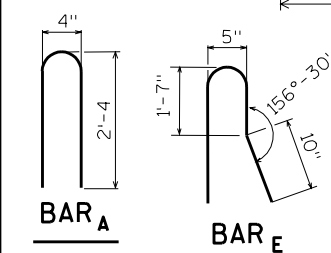
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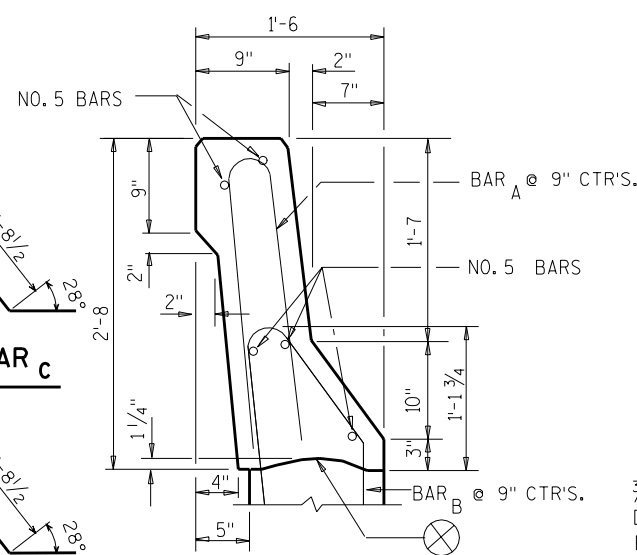
ELEVATION OF PARAPET



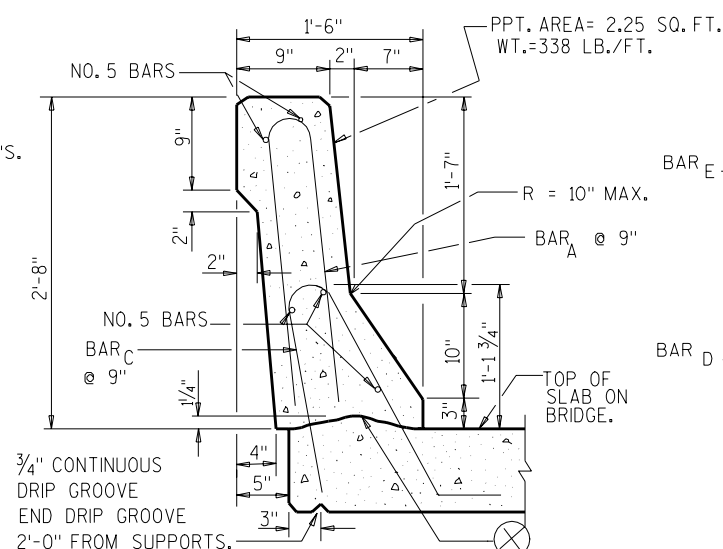
PART PLAN OF PARAPET



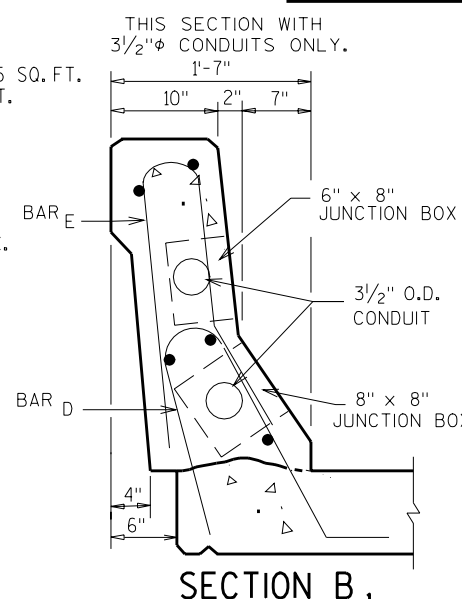
BAR	LENGTH
A	4'-10"
B	4'-7"
C	4'-3"
D	4'-4"
E	4'-4"



SECTION A



SECTION B



SECTION B1

SEE SECTION B FOR DETAILS UNLESS OTHERWISE SHOWN OR NOTED.

NOTES

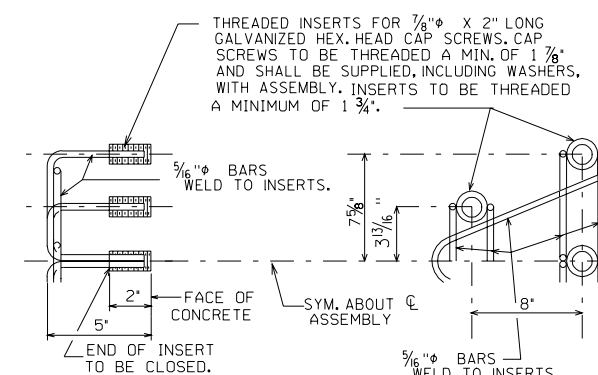
ALL SLOPED FACE PARAPET "B" REINFORCEMENT ARE NO. 4 BARS UNLESS OTHERWISE SHOWN.

⊗ PLATE REQ'D. WHEN DEFLECTION JOINTS ARE REQ'D. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED, PLATE SEPARATORS SHALL BE OMITTED. DEFLECTION JOINTS ARE REQUIRED ON SLAB SPAN STRUCTURES ONLY.

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 2'-11". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 1" 'V' GROOVE.

TRANSITION DETAILS ARE GIVEN ON STANDARD 30.9

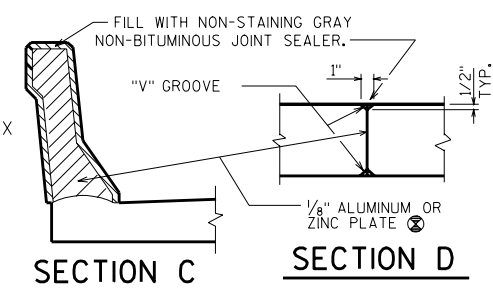
⊗ CONST. JOINT - STRIKE OFF AS SHOWN & FINISH WITH A WOODEN TROWEL.



DETAIL OF ANCHOR ASSEMBLY

NOTE: HEX. HEAD CAP SCREWS & WASHERS TO BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 CLASS C.

ASSEMBLY SHALL BE BID ITEM 'ANCHOR ASSEMBLY FOR BEAM GUARD'-EACH



SECTION C

SECTION D

**SLOPED FACE
PARAPET "B"**

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